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Contents—December 26, 1935

Isn't It Silly 9

Threading on Vertical Turning and Boring Mills 10

Tax Bill Based on Fallacy 15

Innovations in Lincoln Zephyr Production 17-A

New Steel House in Low Cost Field 17-D

Application of Alloy Steels 18

Determination of Aluminum and Alumina in Steels 23

Pressed Metal Industry 26

Automotive Industry 30

Washington News 33

News 36

Rate of Activity in Capital Goods 39

Statistics on Metal-Working Activity 40

Markets 41

Construction and Equipment Buying 62

Products Advertised 78

Index to Advertisers 100

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DECEMBER 26, 1935

ESTABLISHED 1855 Vol. 136, No. 26

Isn't It Silly

GOOD hearted Doctor Townsend has created quite a following for his plan to pay every man and woman citizen of the United States $200 per month for life with the understanding that they will stop working at 60. The annual cost including a ten per cent allowance for administration would be $27½ billions, since there are now some 10,300,000 people of that age among us.

This is an item of overhead which would have to be paid for by somebody and common sense tells us that the people who do work and earn would have to foot the bill. There is nobody else to do it.

Let us add to this great sum a few other items of overhead which must be paid for by the same people and see where we come out.

The cost of government, State, national and local, is now $15 billions per year. This does not include special appropriations for relief, etc. Next year we will probably pay a bonus of $2 billions to the World War veterans and certainly it is not safe to figure less than $3 billions to continue the relief work that will be necessary.

Adding these amounts to the $27½ billions required for Doctor Townsend's plan, we get a really "grand" total of $47½ billions.

Our present total of national income is now running close to $50 billions. So if we take out the $47½ billions that go to the old people, the politicians, soldiers, sailors and folks on relief, we would have $2½ billions left for all those who work and their families. An average of $25 per head per year is the way it figures out. In other words, if you earn let us say $2,000 per year and have three in your family, you would have to turn over $1,925 of it to Uncle Sam for the support of those on his payroll and get along with $75 yourself.

Doctor Townsend meets this objection by saying that if the old folks are given all that money to spend it will create a lot of new employment. Increasing the overhead that has to be borne by those who work never made any community prosperous. It would be equally sensible to say that we could spend our way back to prosperity by increasing the number of our public servants — policemen, firemen, postmen, soldiers, sailors and congressmen—to ten million on their promise to promptly spend all that we paid them. Silly, isn't it?

Because of the many requests for reprints of editorials appearing in THE IRON AGE, the publishers have arranged to make such reprints available in any quantity desired at a price representing cost of production and mailing. Please address Reader Service Department, THE IRON AGE, 239 West 39th St., New York City.

Threading and Grooving on Vertical

VERTICAL turning and boring mills are frequently required to chase threads and groove drums. Special attachments are built to perform these operations with either the right or left-hand head. For highly accurate work a leadscrew is used to feed the boring bar, but when this degree of accuracy is not required, the chasing feed is provided through the regular bar feed rack. The various pitches and leads are obtained by a swing arm unit with change gears built into the regular bar feed or into the special gear train to the leadscrew.

An important point in the design of a threading or grooving attachment is the method of catching the thread between successive cuts. Proper consideration is not always given this point by the purchaser, sometimes resulting in dissatisfaction. A method suitable for one purchaser does not always prove satisfactory to others.

Expert lathe operators are able to catch the thread by their eye and "sense of feeling," but the operator of a vertical mill does not have the same opportunity to closely observe the threading operation and therefore requires some accurate method to assist him.

A number of years ago leadscrew attachments were provided with a split nut to engage and disengage the threading feed. The proper time to close the nut to catch the thread was indicated on a dial rotated by the leadscrew and similar to the dial used on engine lathes. With this arrangement it was necessary to return the bars between cuts by hand movement.

With the advent of rapid power traverse, it became advantageous to use this feature for the movement of the bar between cuts. This necessitated the disconnecting of the feed clutch which is interlocked with the power traverse mechanism. To enable the operator to catch the thread on the re-engagement of the feed clutch, it is often made with one tooth and caused to rotate a whole number of revolutions during one revolution of the table. As the change gears of the threading attachment are between the clutch and the leadscrew, this ratio is maintained for all threads.

If the one tooth clutch is made to run 1 to 1 with the table, the thread may be caught at any engagement. If it makes two or more full revolutions to one of the table, the operator must first mark the starting position of the bar in line with a mark on the head Then the table must be marked in line with a fixed pointer at the moment the clutch is engaged for the first cut. All later engagements will catch the thread if the clutch is engaged when the mark on the table registers with the pointer, provided that

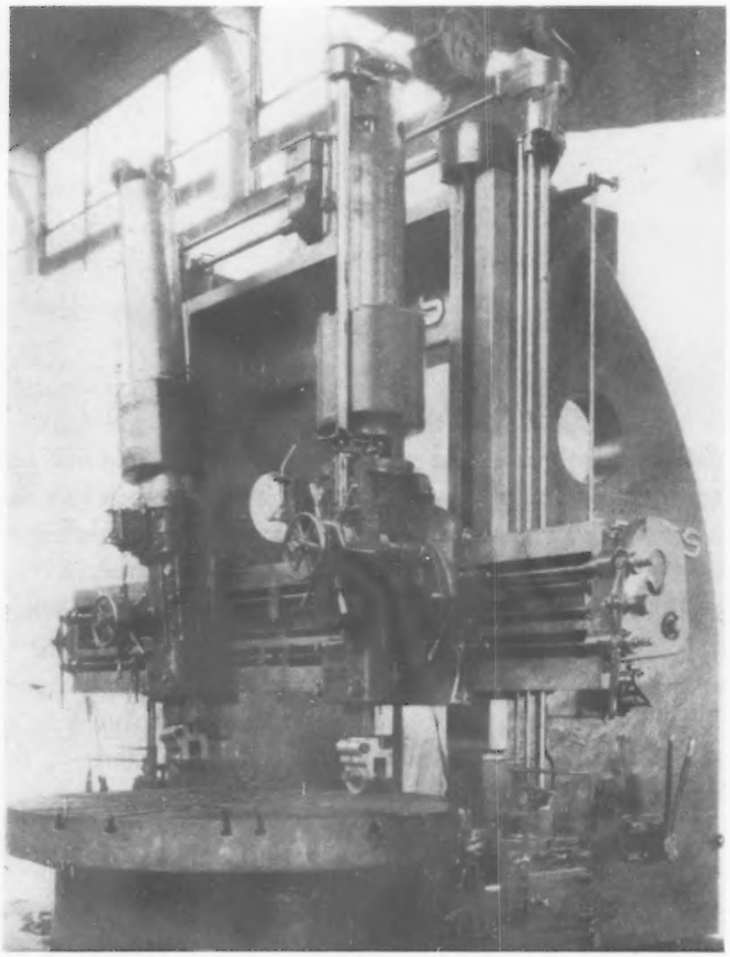


FIG. 1—Betts boring mill equipped with leadscrew threading attachment on the right-hand head. Threading feed is transmitted to the leadscrew through the vertical shaft and gears on top of the counterweight guide.

Turning and Boring Mills

By M. M. McCALL

the bar has been returned to its starting position.

On these attachments the dial is no longer needed on the leadscrew, but the split nut is required to disconnect the leadscrew when the regular feeds through the bar rack are to be used.

When the chasing feed is provided through the bar rack the thread is also caught by the engagement of the feed clutch.

It is not always suitable for a vertical mill to be designed to provide the required ratio to the feed clutch. Some machines are therefore provided with an extra ratio of gears in the feed box which are engaged only when chasing, and which give the required ratio to the clutch when used in conjunction with one of the regular feeds.

Feed Clutch Provided With Two Faces

When a vertical mill is provided with a one tooth clutch to facilitate thread chasing, the engagement of all regular feeds is delayed. If the proportion of threaded work is small, the delay is a large item in the operating time. To overcome this objection, machines have recently been built with two faces on the feed clutch, either of which may be placed in use. The face with a large number of teeth is used for regular feeding; the other face with one tooth is used only when chasing.

A positive stop on the boring bar also permits use of a multiple-tooth clutch when the clutch is given the proper number of revolutions during one revolution of the table. This stop is set before starting the first cut, and after each cut the bar is traversed back against the stop, returning the tool to the same position. The table is marked as previously described and the clutch is engaged when the table mark registers. This method is used on the Betts machine shown in Fig. 1, which is equipped with a leadscrew threading attachment on the right-hand head. The threading feed is transmitted through the vertical shaft and gears on top of the counterweight guide to the leadscrew. As the chasing feed is taken from the bar feed after the latter has been transmitted through the center of the swivel, threads may be cut on tapered surfaces. The change gears for obtaining the required pitch are built into the bar feed mechanism on the end of the cross-rail.

Fig. 2 shows a Niles machine with a threading attachment on the right-hand head. On this machine the leadscrew is attached to the boring bar and travels with it, the split nut being stationary on the swivel cap. The threading change gears are in the cover on the side of the saddle. The thread is caught by means of a one-tooth clutch running 1 to 1 with the table.

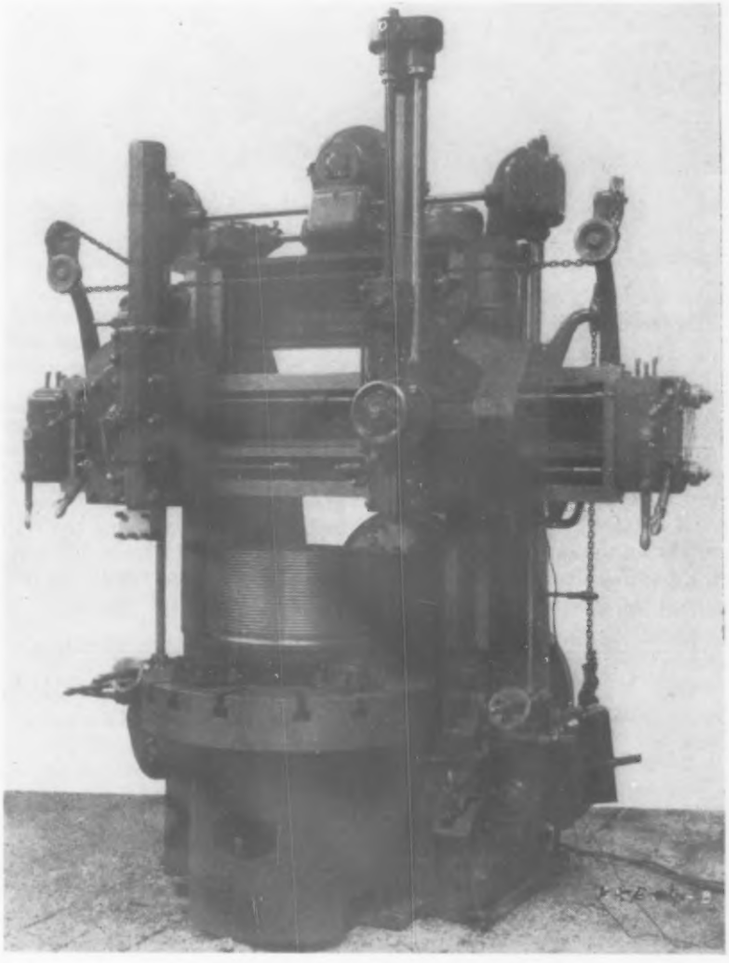


FIG. 2—Niles boring mill with a threading attachment on the right-hand head. The leadscrew is attached to the boring bar and travels with it, the split nut being stationary on the swivel cap.

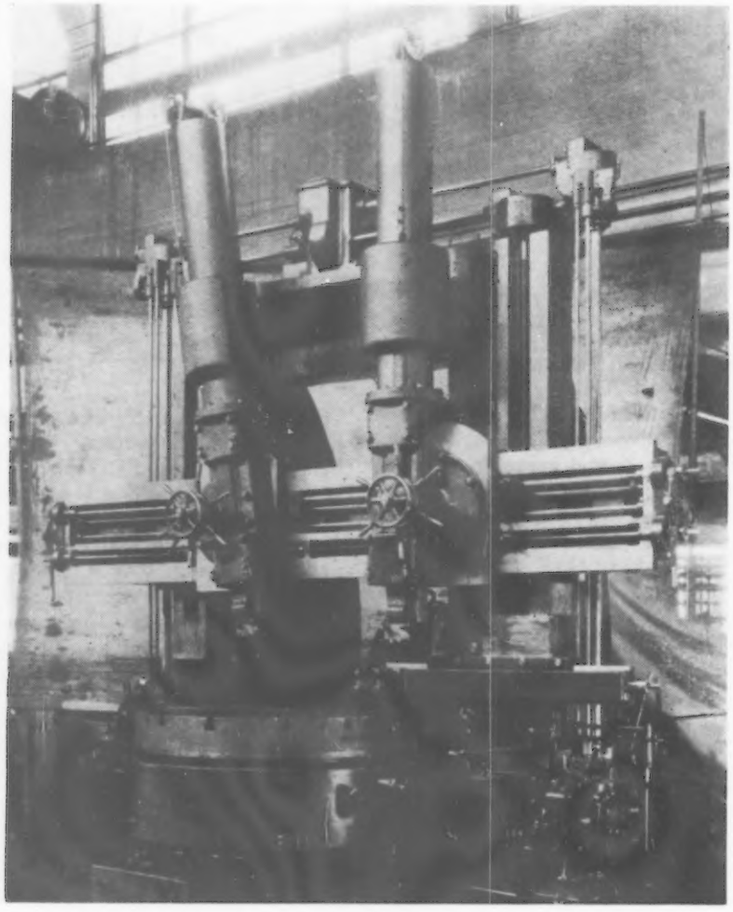


FIG. 3—A drum grooving attachment is mounted on the side head of this Betts machine. Grooving feed is through a screw in the upright which is also used for the regular feeds. The thread is caught by same method as in Fig. 1.

Threading Unit Applied to Side Head

A Betts machine with a drum grooving attachment on the side head is illustrated in Fig. 3. The grooving feed is through a screw in the upright which is also used for the regular feeds. The thread is caught by the same method used on the machine shown in Fig. 1, the side head being returned after each cut against a positive stop clamped to the upright. The change gears are in the rear and detour around the regular feed box.

Fig. 4 shows a Niles side-head boring mill with a threading attachment designed as a unit and applied to the side head. The attachment detours around the regular feed box, and a one-tooth clutch geared to run 1 to 1 with the table is used only for catching the thread. As the feed boxes for the rail and side heads are identical, and as they as well as the attachment are jig drilled, the same attachment may be used with either head and its position quickly changed. The chasing feeds are obtained through the bar rack on the rail head and through a rack on the upright for the side head.

When threading and grooving attachments are to be used for large threads of coarse pitch, or grooves of coarse pitch requiring the use of a wide-face forming tool, particular care must be exercised in the design of the machine. All parts of the feed gear train through which the threading or grooving feed is transmitted must be of heavy design, their number reduced to a minimum and they must be run as fast as possible. It is also important that no speed-up gear ratios (the driving gear larger than the driven gear) be employed. It may not be possible to justify all of the above precautions by figures, but experience has taught the designers to carefully observe them as failure to do so has resulted in much grief.

Thread Chasing On Standard Mills

A standard machine without provision for threading may be used to chase threads by means of the bar rack when the required pitch is exactly equal to one of the feeds. If the pitch is a different amount, some kind of makeshift swing arm must be provided with gears of the proper ratio to give the required pitch when used in conjunction with one of the feeds. (It will not be many years before standard mills are regularly equipped with swing arms in the bar feed mechanism, which may be used when needed for threading, forming and taper turning operations.)

Safety frictions or friction

SUGGESTED USE OF INDICATOR DIAL TO SPACE MULTIPLE THREADS

Column 1	2	3	4	5	6	7	8	9	10	11
					Rev. of Screw Between Engagements	Rev. of Table Between Engagements	Dial Positions at Which Nut Can Be Closed For			
Pitch	Lead	Number of Threads	Rev. of Table	Rev. of Screw			First Thread	Second Thread	Third Thread	Fourth Thread
1/8	1/8	Triple	1	3/4	3	4	0–3–6–9	1–4–7–10	2–5–8–11	.....
3/16	3/16	Triple	1	1 1/2	3	2	0–3–6–9	2–5–8–11	1–4–7–10	.....
1/4	1/2	Double	1	2	2	1	0–2–4–6–8–10	1–3–5–7–9–11	.....	.....
1/4	1	Quadruple	1	4	4	1	0–4–8	1–5–9	2–6–10	3–7–11
1/2	1	Double	1	4	4	1	0–4–8	2–6–10	.....	.....
3/8	1 1/2	Triple	1	6	6	1	0–6	2–8	4–10	.....
3/4	1 1/2	Double	1	6	6	1	0–6	3–9	.....	.....

clutches in the feed mechanism must be made positive when threading to prevent damage to the thread by slippage.

Catching the thread is facilitated if the regular feed which is used causes the feed clutch to make an exact whole number of revolutions during one revolution of the table. When this is the case, the starting position of the bar is marked in line with a mark on the head, and the table is marked in line with a fixed pointer at the moment the clutch is engaged for the first cut. The bar must be returned to its starting position after each cut, and the clutch engaged when the mark on the table registers with the pointer.

If the feed clutch, during one table revolution, makes a fractional part of a revolution, or a fractional part in addition to one or more whole revolutions, the thread may be caught in a similar manner if an equivalent fractional division of the number of teeth in the clutch is exactly equal to a whole number of teeth.

If not equal to a whole number of teeth, it is necessary to figure the number of revolutions the table will make before the completion of one of them coincides exactly with the completion of a rotation of the clutch equal to any exact whole number of teeth. To catch the thread (after the bar is returned to its starting position) the clutch must be engaged when the table has made this number, or a multiple of this number of revolutions starting the count at the moment the clutch is engaged for the first cut. As the count is continuous during the successive cuts, errors are likely to occur unless an accurate counting device is attached to the table.

When the method becomes too complicated, or its accomplishment requires too long a time, it is better to avoid the necessity of catching the thread and reverse the direction of the table without disengaging the feed clutch.

FIG. 5

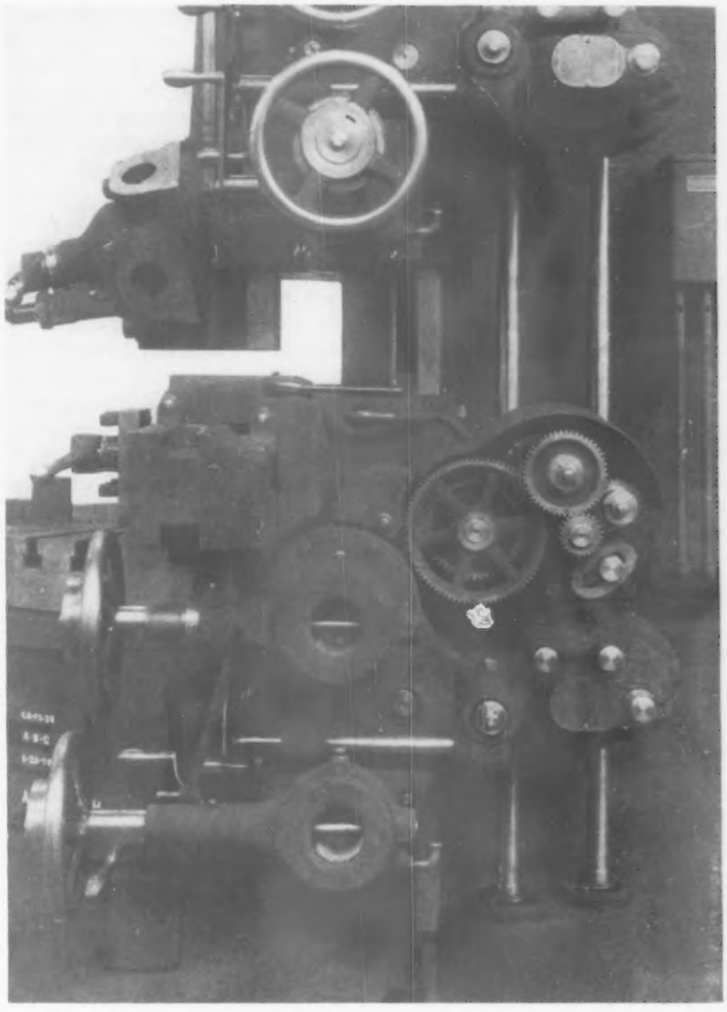


FIG. 4—Side-head boring mill, Niles, with a threading attachment designed as a unit and applied to the side head. A one-tooth clutch geared to run 1 to 1 with the table is used only for catching the thread.

The spacing of the different threads when multiple threaded work is being chased is usually left to the ingenuity of the operator. Although rarely used, a spacing attachment may be furnished on a shaft running at an even ratio with the table. After one thread is completed, the feed is disconnected while the table is turned the required fractional part of a revolution as indicated by an index plate at the point of disconnection.

Use of Indicator Dial to Space Multiple Threads

As previously stated, an indicator dial is no longer needed on a leadscrew attachment when the thread is caught by means of the feed clutch. It could be used in some cases, however, in connection with the clutch to space multiple threads. Suppose a machine with a leadscrew attachment is to chase the multiple threads given in the accompanying table (Fig. 5). The leadscrew has a single thread of ¼-in. pitch. The fifth column gives the number of revolutions of the leadscrew during one revolution of the table to obtain the lead given in the second column. As it is only possible to close the split nut at every revolution of the leadscrew, and as the completion of a revolution of the leadscrew must coincide exactly with the completion of a revolution of the table to catch the thread, the number of leadscrew and table revolutions to fulfill these conditions are given in the sixth and seventh columns respectively. Each successive division line on the dial is geared to

register with a fixed pointer at every revolution of the leadscrew. The numbers in the sixth column will therefore be the number of divisions on the dial between engagements of the split nut to catch the thread. To make it possible to use the same division lines regardless of the number of revolutions of the dial between the disengagement and engagement of the split nut, the total number of dial divisions is made equal to the least common multiple of the numbers in the sixth column. It will therefore have 12 divisions as shown in Fig. 5.

To space multiple threads, a revolution of the table must be divided into halves for a double thread, into thirds for a triple thread and into quarters for a quadruple thread. It must be possible, therefore, to close the split nut when the table has made these fractional parts of a revolution. A study of the table, Fig. 5, will show that if the first thread is cut when the nut is closed with the dial registered at any of the division lines given in column 8, the necessary fractional revolutions of the table to space the second, third and fourth threads will be obtained by closing the nut at any of the division lines given in columns 9, 10 and 11 respectively.

As the thread is caught by the engagement of the feed clutch, the split nut would remain closed during the operation on each thread and only be used to space the succeeding thread.

Cases Involving Table Marking

In cases where a mark on the table is necessary, the split nut is opened when the bar has been returned to its starting position after the last cut on the first thread. The clutch is engaged when the mark on the table registers, and the nut is closed when the dial registers at any position for the second thread. A new mark is made on the table in line with the fixed pointer at the moment the nut is closed, which is used to catch the thread for all cuts on the second thread. The procedure would be the same for additional threads. When necessary to count the table revolutions, a new count is started for each successive thread at the moment the split nut is engaged.

On a vertical mill with either a bar rack or leadscrew attachment having a one-tooth clutch running two revolutions to one of the table, a double thread may be spaced when the first thread is finished by engaging the clutch when the mark on the table is diametrically opposite the pointer. A new mark is made on the table at the moment of engagement, which is used to catch the second thread on successive cuts. If the one-tooth clutch runs 3 to 1, or 4 to 1 with the table, triple or quadruple threads respectively may be spaced in a similar manner by engaging the clutch when the mark on the table is the necessary angular distance from the pointer. In all cases it is necessary to return the bar to its starting position before engaging the clutch. A double thread may also be spaced when the clutch runs 4 to 1 with the table.

When a multiple-tooth feed clutch, during one table revolution, rotates an exact whole number of teeth which is divisible without remainder by 2, 3 or 4, double, triple or quadruple threads, respectively, may be spaced. When the clutch is properly engaged for the succeeding thread, a new mark must be made on the table for successive cuts.

While a one-tooth clutch running 1 to 1 with the table may be preferred by some operators, it is not always suitable. Referring to the table, it will be seen that a speed-up ratio would be necessary between the clutch and the leadscrew for all threads except the first one.

As the speed of the clutch or the number of teeth is increased, additional care must be exercised to engage the clutch at the proper moment.

River Barges with Cylindrical Tanks for Bulk Fuels

CYLINDRICAL tanks in the open hopper cargo space rather than the conventional tank compartments for handling bulk oil and gasoline characterize a new type of river barge recently equipped at the Leetsdale, Pa., plant of the McClintic-Marshall Corpn., subsidiary of Bethlehem Steel Corpn., Bethlehem, Pa., for the American Barge Line Co.

Basically, the barge is of the hopper type used in transporting cotton bales between Memphis and New Orleans; 158 ft. overall, 35 ft. beam, and 11 ft. deep. To accommodate the cylindrical tanks which measure 14 ft. 6 in. in diameter and 40 ft. in length, the hopper was divided into three equal compartments, each of which has two tanks with the necessary piping securely anchored in place, side by side.

This arrangement embodies distinct advantages in that it precludes any loss through leakage and provides adequate means of controlling the discharge of the cargo.

Corporation Tax Bill Is Based On Fallacy

National Steel Corpn. Survey Disclosed Preponderance of Small Investors Among Corporation Stockholders

BY ERNEST T. WEIR,

Chairman, National Steel Corpn.

ERNEST T. WEIR

o o o

IN an address, here abstracted, at the thirty-eighth annual dinner of the Illinois Manufacturers Association in Chicago, Dec. 10, Mr. Weir lashed the Administration's anti-big business complex and exposed the falsity of its position on corporation taxation. The New Deal philosophy of class antagonism is as out of tune with American traditions as its contempt for private rights, he declared, and unless business men fight those concepts with every means in their control, there will be nothing to fight for four years hence.

o o o

HOWEVER much individual acts of the Administration may seem to conflict with one another, every one of them does one thing—in some way, it transfers into the hands of the Government at Washington powers, rights, and privileges which traditionally have been the undisputed possession of individual citizens.

This attempt to concentrate power is no new thing. Peoples in economic or political trouble have been beguiled into the belief that a small group of rulers could, by arbitrary dictation, bend the forces of nature to their will, and accomplish overnight a general progress which actually can be matured only by evolution through years. The rulers failed, but before doing so, tried to save themselves by grasping more and greater powers, which by their abuse plunged the countries into a condition far worse than the one from which they started. Where this has happened, peoples have done one of two things. They have wrested the power from the hands of these self-constituted rulers and taken it back to their own control, or they have gone into a long period of decline and decay.

It is notable that enlightenment and general well-being throughout history have been highest in those countries where the individual citizen has been most free.

The process of concentrating power into a few hands has been going on in our country. In fact, it is well on its way. The Administration has tried to conceal the fact that this power extends over all citizens, by creating the impression that its acts were designed to curb only the wealthy and employing groups, to restrain their power in the interests of the great body of citizens.

Justification of Tax Bill Is False

In the corporation tax bill, the Administration not only supported the principle of unequal taxation, but based it upon a fallacy. This bill, which the President sought to justify in a lengthy statement, can be supported on only two grounds: First, that the earnings of large corporations are proportionately larger than those of other corporations, and second, that the owners

of large corporations are all members of the wealthy class, who presumably are able to bear a major share of the tax burden.

Neither of these happens to be correct. There were arguments pro and con as to how many people owned stock, whether they were weathy, how much they depended upon dividends for income, and many other phases of stock ownership. In order to get first-hand information concerning the people who own the National Steel Corpn., a questionnaire was sent out to every individual holder of stock asking a number of simple, direct questions, and making no requirement that identity be revealed unless it was so desired. Here is what was found:

What Survey of National Stockholders Revealed

The stockholders who responded are spread over 39 States and the District of Columbia. Over 65 per cent gave their occupations, and those most frequently listed were farmer, laborer, clerk, professional, technical, retired, housewife, business man and unemployed.

The returns showed that 27 per cent have a total annual income from earnings and investments of less than $3,000; 16 per cent have between $3,000 and $5,000; 23 per cent have between $5,000 and $10,000, and 31 per cent have more than $10,000. Three per cent did not answer the question.

In other words, nearly half of these stockholders have a total annual income less than $5,000 and two-thirds have less than $10,000. Thirty-nine per cent of the stockholders answered that they received their chief support from investments. Ninety-three per cent had purchased their stock and only about 6 per cent had received it as a gift or through inheritance. Of the total replies 73 per cent answered they are the chief support of their families and have an average of 3.32 dependents each.

Those below $3,000 own an average of 46.6 National shares; they own securities in an average of 9.9 corporations other than National; their National holdings represent 27.6 per cent of the value of all their investments, and they are dependent upon investments for 38.9 per cent of their total income.

Those between $3,000 and $5,000 own an average of 56.6 National Steel shares; they own securities in an average of 13.5 corporations other than National, their National holdings represent 20.5 per cent of all their investments, and they are dependent upon investments for 41.7 per cent of their total income.

Those between $5,000 and $10,000 own an average of 109.5 National Steel shares; they own securities in an average of 19.5 corporations other than National; their National holdings represent 13.9 per cent of all their investments, and they are dependent upon investments for 46.4 per cent of their total income.

Those above $10,000 own an average of 383.6 National Steel shares; they own securities in an average of 25.7 corporations other than National; their National holdings represent 9.8 per cent of all their investments, and they are dependent upon investments for 57.1 per cent of their total income.

Small Investor, Not Big Business, Is Penalized

This Administration imposed a higher rate of tax upon large corporations than upon small ones, with the professed intent of penalizing big business.

It is not big business that is penalized; it is the small investor, because he happens to have made his investment in a large corporation, and it is noteworthy that many small investors are attracted to the large corporation by the safety factor. Although the big majority of the investors in the large corporations of this country are small stockholders who have invested their accumulated savings in large industries, they are to be penalized by higher tax rates and the only apparent purpose of so doing is to enable the Administration to rail at big business and create class hatred. It wants to appeal to the voters with the plea that it is penalizing the wealthy of the country.

Actually, the bill turns out to be a direct thrust at the welfare of one out of every four persons in the country, with at least three of those four not wealthy by any fair standard of comparison.

Class Hatred Out of Place in Classless Society

This is only one measure, but it is a prime example of the Administration's attempt to win support for its program by creating the idea of "classes." It is out of the same cloth with the repeated "scoldings" of business and its leaders, and the attempt to establish business in the minds of the people as the "scapegoat" upon whom may be laid the blame not only for this depression but also for poverty and all other human ills in good times or bad. In America, traditionally, we have had no classes. We do have different economic strata. We have rich, well-to-do, comfortable and poor. But there is nothing to prevent an individual from moving from one stratum to any other.

As a check, National Steel Corpn. made a survey of the management of its companies, from those holding positions as superintendents or department-managers upward to the highest executives. With but one exception, these men started out with nothing but their own ability and worked their way through a succession of minor jobs until their initiative and experience brought them positions of responsibility.

Frontiers Not Gone, As Charged

Hand in hand with this "class" idea, and just as bad, has been the spread of the spirit of defeatism by Administration satellites who have gone about the country talking about the need for "revolt" against present conditions, and sermonizing on the futility of the average man's struggle to win comfort and security in the present economic order. The supposition is that the frontiers are gone, that opportunities are limited, and that the great rank and file of people cannot hope to take care of themselves but must look to a benevolent government. This is nonsense. Opportunities in the automobile, radio, aluminum or airplane industries have been the development of little over a generation, and who can tell what the future will bring in the way of new industries and new opportunities?

New Deal Aims to Suppress Individual Freedom

Every act of this Administration, every official declaration of policy, every expression of the philosophy of government by one of its inner-circle adds to a mass of evidence that its one, central, dominating credo is that the individual citizen must be stripped of the power to regulate his own economic acts, that this power shall be concentrated into a tremendous reservoir at Washington, and there controlled

by a group of supermen. Whatever its motive, this belief expresses a distrust for the individual citizen that amounts to contempt.

If it is well intentioned, this desire to concentrate power can be based only on the belief that government can do a better job than individuals. The acts and claims of the Administration can have no meaning at all unless you predicate them on the thesis that its leaders assume that they are wiser, more able, and more moral than the hundreds of thousands of men who manage business, large and small, in this country.

Power to regulate agriculture, supposedly in the public welfare, would be power to say how much of what should be grown, who should grow it, and how much he and handlers of the product should receive. Power over industry would dictate what articles should be made, which plants should make them and in what volume, what workers should be employed and in what number, how many hours they should work, and what wages they should receive. Power to control supply would be fruitless without power to control demand, so the Government would have to be in position to dictate what consumers should buy and how much they should pay.

There is no such thing as limited control over an economic system. Any part not under control disrupts the whole structure. Do you believe the Roosevelt Administration or any other Administration is wise enough, strong enough, and impartial enough to assume this control and to administer it constructively? No other government or group of men at any time anywhere in the world has been able to do so. Whenever the attempt has been made, the result has been disaster for the people.

Enthroning Inefficiency

Governments are composed of men. Like any business, no government is stronger or better than the men who run it. Through its very nature, we have come to expect a certain inefficiency and waste in government that we would never tolerate in our own business. This is because of its far-flung activities, the temporary tenure of office of the men who run it, and their selection for political reasons rather than special fitness for their jobs. That is why in this country the people have tried to confine government to broad but simple and limited functions, and we have preferred to put up with the inefficiency of a periodic turnover in public servants rather than take the chance on a permanent ruling class that might be good, but also might be very, very bad. It is just such a class that the accomplishment of New Deal objectives would create and intrench.

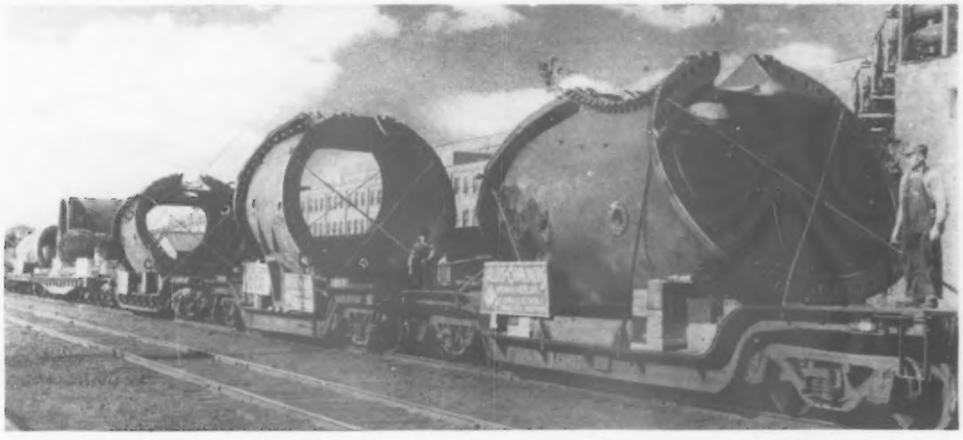
The Challenge to the Business Man

Business men are charged with the greatest trust in the world—the guardianship of the economic structure upon which millions of stockholders and employees depend for their living, and upon which the whole people depend for the necessities of life.

If you are an executive of a corporation, you are a trustee of its funds. If you were a guardian of a minor or a trustee of a charitable trust, you would resist to the utmost anything which tended to destroy the principle of your ward or charity. You are trustees of the money of your stockholders. You are the person to whom your employees look for employment and it is your duty to defend the money and property of your trust against its dissipation by overwhelming taxation, governmental control and so-called "economic planning."

You would not hesitate to use some of the principal of a trust fund for the defense of the remainder. You should not hesitate to point out to your stockholders and employees the certain destruction of their property by the methods of the present Administration. You must go beyond this by spurring your trade and business organizations to greater activity, and by doing your utmost to awaken your communities to the gravity of this situation. You must fight now, with every means in your control, or you will have nothing to fight for four years from now.

THIS shipment of 450,000 lb. consists of six carloads each, loaded with a cast steel casing section for one of the four 115,000-hp. Boulder Dam turbines which are being constructed by Allis-Chalmers Mfg. Co. Each complete turbine will require 26 cars to move it from Milwaukee to the erection site. The water flowing through one in 24 hr. would be sufficient to supply the daily needs of a city of the size of Detroit.



Innovations in Lincoln-

IN setting up production for its new V-Twelve Lincoln-Zephyr, the Lincoln Motor Co., Detroit, has introduced many innovations in automobile manufacture.

Conventional practice is to assemble the chassis by installing a running gear and mounting the engine in a frame. Then the body is dropped on the frame and the car completed. In the case of the Lincoln-Zephyr, bodies are painted and trimmed on a long overhead monorail conveyor from which they go to an assembly line only 350 ft. long. Here the engine is mounted and running gear attached.

For the first time in the automobile industry, sheet metal parts, including fenders and wheel shields, move along a paint line which parallels the body line. This insures the fact that sheet metal parts will be painted in the same shade of color as the body itself.

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BODIES are carried on overhead monorail chain conveyor through lacquer and trim operations. Body rests on metal frame attached at each end of body by chain to overhead conveyor. Body thus is suspended at ideal height for men to work on it.

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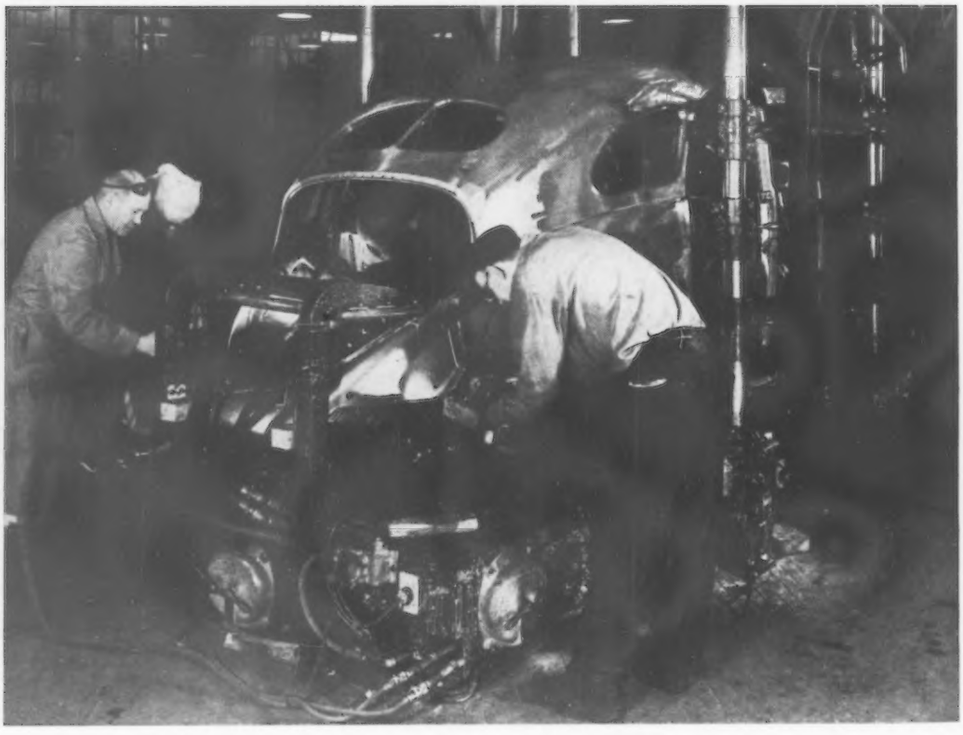

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THERE are 3740 welds used in making the Lincoln-Zephyr body, of which 3435 are spot welds. Special fixtures such as the one shown here are employed for some of major operations.

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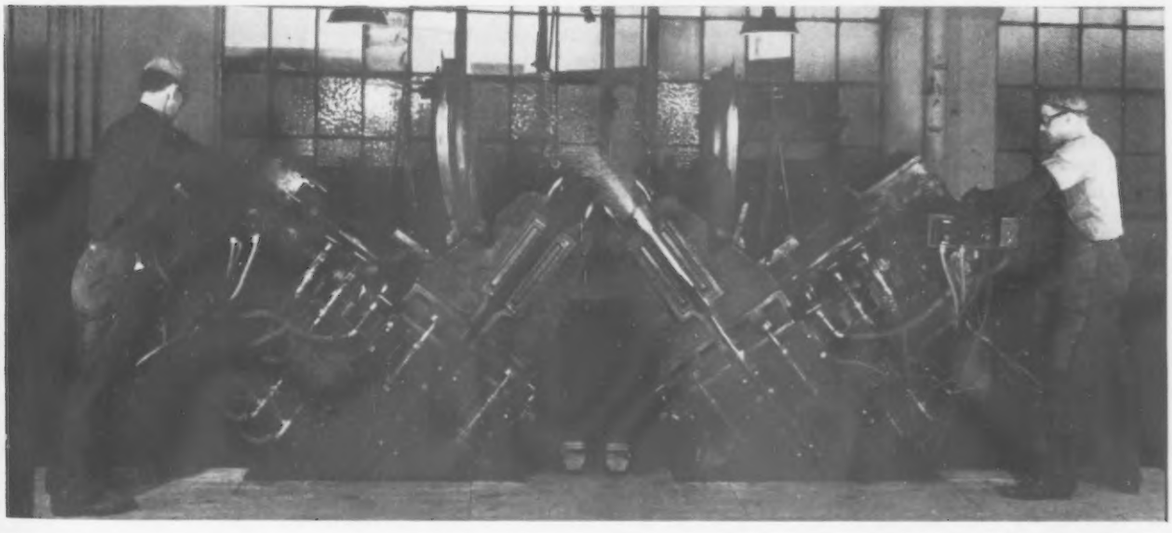
Zephyr Production ▲ ▲ ▲

All spray booths are of the hydro-filter type, filtered air being forced into the booth. The suction at the inlets to the hydro-filter units located near the floor, plus the air being drawn into the booth at the ceiling, provides a continuous down current of fresh air. Fumes from spray guns thus are removed at the floor level of the booths and workmen are sure to get a constant supply of fresh clean air. The air "curtains" draw away floating particles of lacquer, the lacquer being washed and reclaimed through special tanks.

It is customary in most body plants to have bodies carried on a drag-link type of conveyor, but at the Lincoln factory provision has been made for carrying bodies on an overhead monorail chain conveyor through the lacquer and trim operations. The body itself rests on a metal frame which is attached at either end of the body by chain to the overhead conveyor. The body thus is suspended at an ideal height for men to work on it without stooping or otherwise getting into an unnatural position where they cannot do the most efficient work.

Having no orthodox chassis or chassis frame, the Lincoln-Zephyr pioneers in a new type of all-steel bridge truss construction. Body

REVERSING the usual procedure of mounting the engine in a frame and dropping the body on the frame, the V-twelve engine is mounted in the all-steel bridge truss body as the final major assembly process.



MACHINE for welding two side panels to rear panel is actually two welders in one. Mounting is such that either or both machines can be moved about on base so that one unit may be placed exactly in proper relation to other. Each unit has two 300 kva. transformers.

panels are made a part of the load-carrying structure, permitting light weight with unusual strength. The body building is done at the Le Baron plant of the Briggs Mfg. Co. There special jigs and fixtures have been designed to handle work during the unusual number of welding operations. Wherever possible, portable welders designed by Briggs engineers are used. In the joining together of the light frame and the body panels, for example, the work is put into a large fixture and the actual welding is done with portable machines. Incidentally, a total of 3740 welds is used in making the Lincoln-Zephyr body. There are 3435 spot welds, 130 arc welds and 175 gun welds.

The machine for welding the two side panels to the rear panel is actually two welders in one. Mounted on a heavy fabricated steel base are two automatic welding machines identical in design. The mounting arrangement is such that either or both machines can be moved about on the base in order that one unit may be placed exactly in proper relation to the other, bringing each set of welding dies not only at the desired distance from each other but also at the correct angle so that the direction of push-up is tangent to the body stampings at the point of weld.

Each of the welding units follows the conventional design of Taylor-Winfield body welders, so far as general principles are concerned. There is a fabricated steel base frame which houses the transformers and carries the stationary and movable platens, power push-up drive, clamping cylinder frames, copper secondary terminals, etc. To the terminals are bolted the die holders, which are of cast copper and which carry the cast aluminum bronze dies. These dies are of a special analysis having great hardness and relatively high current conductivity. The clamping arms, of cast steel to provide utmost strength and rigidity, are hinged on heavy hardened steel pins at one end, permitting the free ends to be raised by air hoists to admit the body panels.

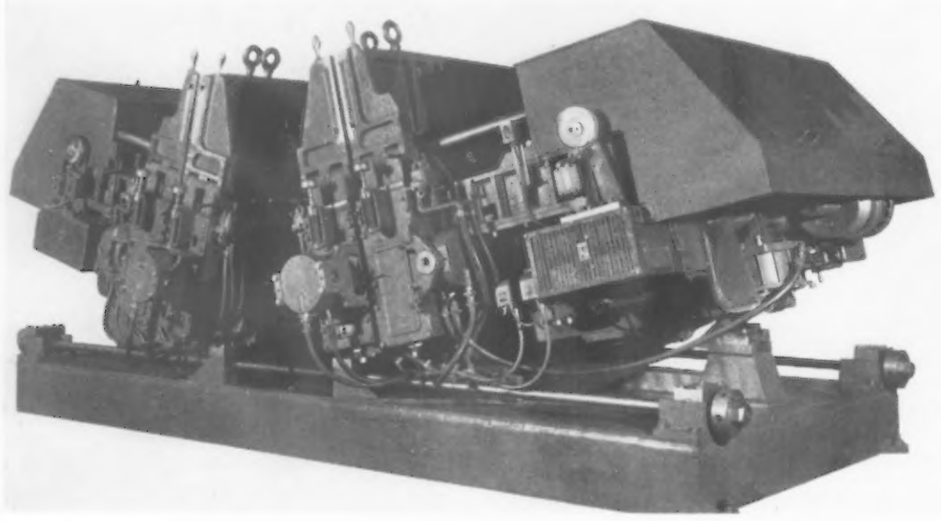
When the panel stampings are securely locked into welding position in the locating fixtures, the clamping arms are lowered, bringing the upper dies to bear upon the abutting edges of the panels. Hand-operated latches are then hooked over the free ends of the clamping arms and air admitted to the clamping cylinders, of which there are four—one at either end of the clamping arms — providing adequate, evenly distributed pressure over the full length of the dies to prevent slippage of the panels, and to insure good electrical contact.

Each of the two welding units has two 300 kva. transformers, making a total of 1200 kva. Primary circuit to the transformers is controlled by magnetic contactors actuated by pilot switches on the camshaft, automatically engaging the contactors at the beginning of the weld and cutting off the current upon completing the welding cycle.

The cycle of operation is as follows: With clamping arms raised, the three body panels are placed in the locating fixtures; latches are swung into place; clamping pressure is applied through hand-operated valves; motor of each unit is started by push-button, causing the slides to move forward, actuated by twin cams on the upsetting unit, thus completing the weld. Clamping pressure is then released, latches disengaged, and clamping arms raised to permit removal of the welded assembly.

The machine is arranged so that the panel assembly rests in the cradle with the weld line in an approximately horizontal plane, the body being upside down. This welding position is used so that much of the molten metal at the weld line drops off through gravity, minimizing the job of burr or "flash" removal. The base, frames and numerous smaller parts of the machine are of fabricated steel, giving greater strength and weighing less than cast iron construction.

Average production of the machine is slightly less than one body per minute. Each weld is approximately 68 in. long, or 136 in. per body. Thus, output amounts to 680 ft. per hr. or 5440 ft. per 8-hr. day. The machine weighs approximately 95,000 lb.



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BASE, frames and numerous smaller parts of large flash welding machine are of fabricated steel, giving greater strength and weighing less than cast iron. This machine produces slightly less than one body per minute. Each weld is 68 in. long or 136 in. per body.

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New Steel Sheet House in The Low-Cost Field

DESIGNED especially with the aim of winning recognition as the "Ford" of steel houses, an assembled sheet steel house has been completed by National Houses, Inc., 480 Lexington Avenue, New York. The structure is assembled entirely from standardized parts of cold-rolled copper-bearing black sheets and will be marketed with four, five and six rooms, in non-standardized arrangements, at prices ranging from $3,000 to $6,000.

The outside wall panels are made of No. 14-gage black sheets in standard widths of 2 ft. and 4 ft., with a standard height of 9 ft. The panels are held together by structural clamps. The clamps also serve as supporting members for the roof or second floor. For this purpose angles are bolted or welded to the top of the clamp and on these the roof or floor is laid. The roof is supported by stiffeners made of 6-in. channels formed from 12-gage black sheets, which serve as joists to which 2-ft. or 4-ft. panels of 14-gage sheets are clamped. Partitions, like the walls, are formed of 2-ft. or 4-ft. sheet steel panels clamped together. Windows are of steel sash welded to the wall panels. Ceilings in a one-story house are identical with the roof and consist of No. 14-gage sheets. In two-story dwellings the ceilings are also made of No. 14-gage sheets. Interior walls are of No. 14-gage sheet panels fastened by invisible clips to the clamps. Plywood panels, sheet rock or any other wallboard panels may be used in place of steel sheets for the interior walls at the option of the buyer.

In two-story houses the space between the ceilings and the floor above is filled with 4 in. of National insulation, which is a granular mineral that is fireproof and a non-conductor of heat and electricity, having the same insulating value as ground cork or rock wool. Used in a thickness of 3½ in. in the walls, it is stated to be equal in insulating value to 52 in. of brick. The roof is also covered with insulation, in this case mixed with asphalt and other binders and poured on the surface to form a monolithic slab. After the slab has set, the roof, it is asserted, requires no further treatment. Sloping roofs can be provided if desired by the purchasers.

The first floor is made of 6 in. waterproofed National insulating concrete extending below the frost line with a layer of 1½ in. of nailing concrete superimposed. Anchor bolts for the wall panels are set in the foundation. A wooden floor can be nailed into the concrete, or tile or linoleum may be cemented to it. A basement can be provided if so desired, in which case steel floor units are used to support the first floor.

All interior walls, in case they are made of steel, are sprayed with two coats of rustproof paint. This covering, it is stated, has protected

sheet steel against rust for more than 15 years, without further treatment. The steel sheet panels forming the second floor, in a two-story house, may be left bare, or may be painted or otherwise treated.

The exterior walls are covered with a newly invented finish called Velmar, containing marble and other ingredients to make it rust-inhibitive. The finish has a unique, soft appearance, something like limestone, and is guaranteed to stand ordinary exposure for at least five years without refinishing. All concealed steel surfaces are treated with National rust-proofing compound.

The interior wall panels are bent up 3 in. at the bottom to provide space for wiring and electric outlets. Each room will have two electric switches, but there will be no wall or ceiling fixtures except in the kitchen.

The National house is not standardized. Any size of house, in multiples of 2 ft., may be assembled, with any equipment desired. Several designs for this type of house construction have been drawn by William Van Alen, well known as the architect who designed the Chrysler Building, New York, but any other design, within the limitations mentioned, may be used.

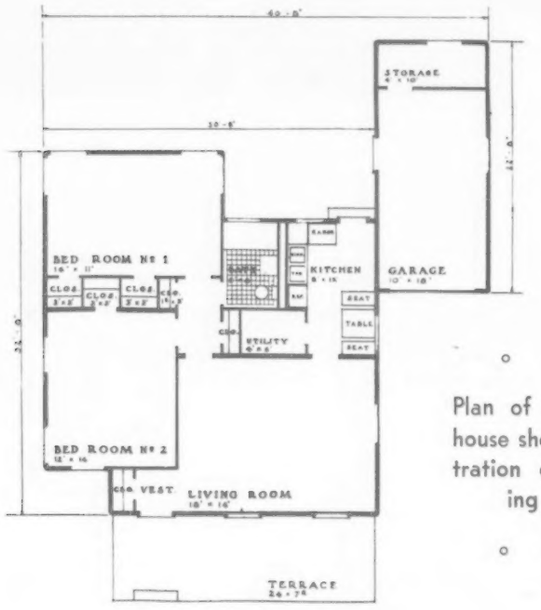
The method of construction developed by National Houses, Inc., is intended for the low-cost field, and the average cost to the buyer, exclusive of land, will be approximately the same as, or lower than, for a house of the same size, with the same equipment, built of wood or other materials.

Marketing will be through local dealers, who will employ local labor in the sale and assembly of houses. The structures will likewise be equipped with materials obtained locally for plumbing, heating and electrical installations. The first sales and assembly dealer to be appointed was R. T. Redpath, Pittsburgh.

Most of the past year has been consumed in arranging for mass production of parts and only one complete house has actually been assembled, having been erected primarily for the purpose of checking fabricating drawings of the units of which the houses are assembled. The company reports, however, that through its sales and assembly dealers it now has several hundred houses under contract.

The average National house will require about 8 tons of steel. Besides steel sheets, a small amount of aluminum molding and stainless steel trim is used.

The National type of steel construction insures low upkeep and is proof against fire, vermin, termites, lightning, hurricanes and earthquake shocks, the company reports. The house also is suitable for air conditioning, and may be easily enlarged. The National system of construction has been approved for long-term Federal Housing Administration insured loans.



Plan of four-room house shown in illustration on preceding page.

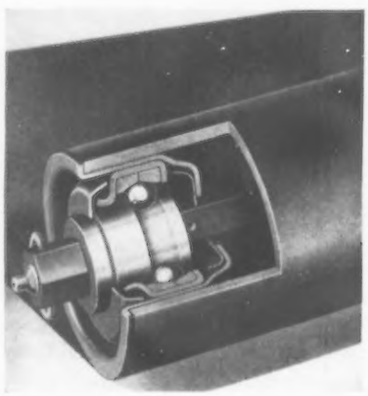
Electrode for Welding 25-12 Stainless Steel

FOR welding the 25-12 variety of stainless steels the Lincoln Electric Co., Cleveland, is offering an arc welding electrode named the "Stainweld B." Because of its higher chrome content the new electrode is said to be particularly advantageous for welding stainless clad steels.

The new electrode is heavily coated, utilizing the shielded arc principle of producing welds free from oxides and nitrates, brittleness and porosity. The weld metal resists tensile stress of 95,000 lb. per sq. in., and the deposited metal possesses the same resistance to corrosion as the 25 per cent chromium, 12 per cent nickel plate. High ductility and unusual resistance to abrasion are also features, and deposits of the new material are said to maintain these physical properties at high temperatures. Furthermore, scaling is reduced to a minimum for this type of material.

The Stainweld B electrode is available in 5/32 and 3/16-in. sizes, 11 in. long.

THE ball bearing assembly, shown in a cut-away illustration, is featured by the Logan Co., Louisville, Ky., in its line of industrial conveyors. A hexagon shaft, rather than round, is employed. The lubricating and sealing provision anticipates probable conveyor use in dust laden areas or in the handling of materials having characteristics detrimental to bearings which do not provide sealed assembly.



Metal Radio Tube Eyelets Electric-Furnace Brazed

COMPLETELY automatic control of the temperature, time in the furnace, and furnace atmosphere during brazing and bright-annealing, thereby assuring uniformity of product and duplication of results, have been attained by the Radiotron Division of the RCA Mfg. Co., Inc., Harrison, N. Y., in the manufacture of the all-metal radio receiving tubes developed by the General Electric Co. Savings in production and maintenance costs have also been realized.

The production set-up includes a General Electric mesh-belt conveyor-type electric furnace and combustion-type furnace-atmosphere controller, the latter supplying processed city gas to serve as the furnace atmosphere for only $1.75 a day. The combination is used in electric-furnace brazing the special-alloy eyelets of the all-metal tubes, in which are located the glass beads used to insulate the leading-in wires, to the "header," the annular part just above the base of the tube to which the envelope is later welded. The eyelets are first welded to the header. Next, a ring of copper wire is placed around each eyelet and then the header sub-assembly is placed on the mesh-belt conveyor of the electric furnace, coming out at the discharge end completely brazed and ready for the next step in the manufacturing process.

The 41-kw. furnace, with a capacity of 225 lb. gross per hr. is operated continuously, the belt traveling at 1 1/3 ft. per min. The heating chamber of the furnace is 7 ft. long and the cooling chamber 18 ft. long. The belt is 8 in. wide, with a guard edge. Operation of the furnace is at about 2050 deg. F. Both the belt and the ribbon-type resistors of the furnace are of long-life nickel-chromium alloy. (Ni. 80, Cr. 20.)

In those tubes having a lead through the top of the envelope, the additional eyelet used there is similarly both welded and brazed. In that case it is desired that the copper flow to a greater extent; hence the travel through the furnace is at 1 ft. rather than 1 1/3 ft. per min.

ALL-METAL radio receiving tube parts are copper-brazed and "fired" in the mesh-belt, conveyor-type electric furnace pictured above. Temperature, time in furnace, and furnace atmosphere are automatically controlled. The furnace has a gross capacity of 225 lb. per hr., and is operated continuously.

New Heavy-Duty Two-Stage Regulator

FOR delivering large volumes of oxygen at relatively high pressures, such as encountered in heavy cutting, deseaming jobs, and in furnace tapping, the Air Reduction Sales Co., Lincoln Building, New York, is offering a new two-stage pressure reduction type regulator designed as the Airc-DB style 8490.

The device is for use principally where the oxygen demand is

greater than can be handled by the conventional regulator, or where close pressure regulation and a low end-point are desired. It is also for use where precise pressure regulation with medium flows is involved, and whenever the oxygen demand per regulator is in excess of 1000 to 1200 cu. ft. per hr.

Maximum operating pressure is 200 lb. per sq. in., and maximum delivery capacity is of the order of 3000 cu. ft. per hr., with delivery pressure of 100 lb. or more. Pressure regulation furnished is said to be practically independent of the rate of flow, from full cylinder pressure down to the regulation end-point. Pressure variation is said generally to be less than plus or minus ½ lb. per sq. in.

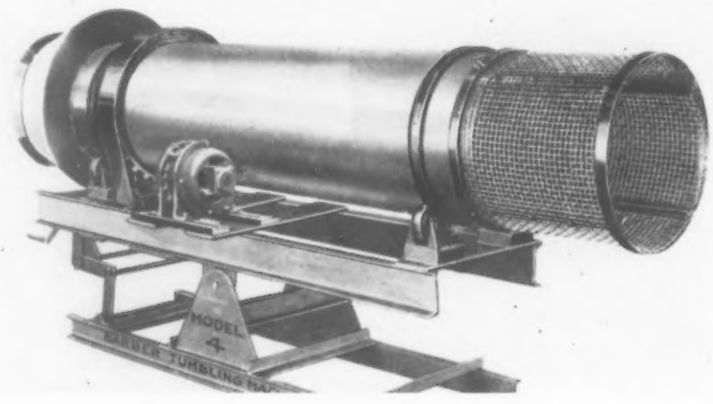
Emphasized as a radical departure from conventional design, the new regulator employs the "feed back" principle. The low pressure cavity is connected to the space in back of the first-stage diaphragm by the passage through the control tube on the back of the regulator. The first-stage spring maintains a certain difference in pressure between the first and second stages. Whenever the adjusting screw is turned in, and pressure developed in the low-pressure cavity, the same pressure will be developed in back of the first-stage diaphragms. This pressure augments the effects of the control-spring thrust so that the first-stage pressure increases by an amount equal to the operating pressure.

The effect of the control tube is the same as if the first-stage side of the regulator were equipped with an adjusting screw of its own and this screw were turned the same amount as the operating pressure adjusting screw. For equivalent characteristics a long and heavy control spring would be required. With this arrangement, the difference between the first and second-stage pressures is said to be maintained substantially constant, with the difference being equal to the first-stage pressure when the adjusting screw is entirely released.

To this feature is attributed excellent regulation, because there is a definite relation between the first and second-stage pressures which will give the best regulator characteristics. By the feed-back principle, the two stages keep pace with each other, and the size and weight of the regulator are materially reduced.

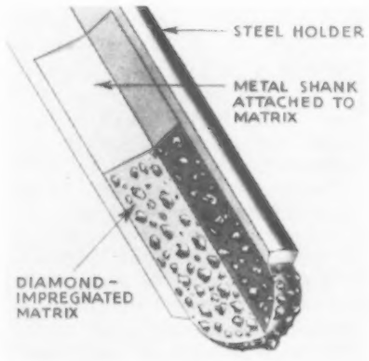
Improved Continuous Operation Tumbling Machine

IMPROVEMENTS in design and construction of the Barber continuous operation tumbling machine, built by the Barber Tumbling Machine Co., Oak Park, Ill., involve a new hopper, conical in shape, and made an integral part of the cylinder; therefore revolving with the cylinder. New welded assembly provides that the hopper is made tight to the complete circumference of the cylinder end, thereby eliminating any open space into which dust or other elements may feed. A new hopper pick-up flange feeds material into the hopper as fast as it is shoveled or otherwise introduced. Charging height is lowered, making for lessened fatigue. A relocated position for the motor provides increased accessibility. The cylinder is 20 in. in diameter, 7 ft. long, not including a 20-in. screen extension. The angle of tilt may be changed during operation. This provision permits of increased or decreased feed at the discharge end to meet tumbling requirements for particular materials or lots of materials.



Diamond Impregnated Wheel Dresser Line

CARBOLOY CO., Detroit, manufacturers of cemented carbide products, announce the release of an added grade to their diamond



impregnated wheel dresser line; making coarse, medium and fine mesh size diamond dressers available; completing the line for all hardnesses and sizes of grinding wheels.

The new grade has an extra

coarse mesh of diamonds and has been developed to increase the order of performance on the larger and harder grades of grinding wheels used on surface, cylindrical and centerless grinders.

No remountings are required, and each dresser may be used throughout its entire life on the same size wheel.

High-Speed Hydraulic Presses, "HydroLectric"

HIGH-SPEED presses, "HydroLectric," built by R. D. Wood Co., Philadelphia, are operated by individual pumping units. A variable pressure and variable delivery rotary piston pump is direct connected to an electric motor. Both are mounted on a substantial combination base and located close to the pre-fill tank. An adjustable time delay is provided for automatically holding full pressure on the work during any dwell period. Control elements may be arranged for either semi-automatic or fully automatic cycle operation; these involve stop and immediate return to top position at any cycle point.

For deep drawing, the equipment includes, preferably, a hydraulic die cushion located on the press bed. The oil employed as pressure fluid provides lubrication for rams and packings. Cylinders, platens and side frames are cast open-hearth steel. The heavy machinery steel columns are shrunk into place. The press shown is of 1500 tons capacity and the bed, 48 x 48 in., is equipped with hydraulic die cushion. Pump capacity is 44 gal. per min. at 2500 lb. working pressure. The motor is 75 hp., 850 r.p.m.

Variable Speed Unit Has Increased Utility

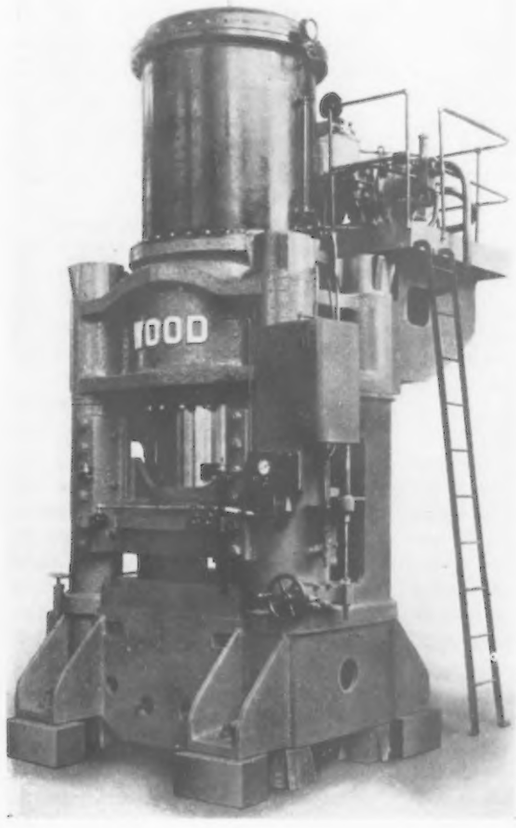
ANNOUNCEMENT is made by Link-Belt Co., Philadelphia, that greater range and flexibility of application have recently been incorporated in its P.I.V. gear variable speed transmission. This will permit the entire line to be furnished in the following combinations and sizes; motorized (when desired) with motor forming an integral part of the unit; with or without speed reduction gearing; with horizontal or vertical box; and, in five sizes up to 15 hp. capacity. Vertical as well as horizontal units are now available. The motorized construction eliminates the need of a separate motor base plate. The operating principle of the basic unit remains the same as when introduced to American industry six years ago. An improved unit is illustrated.

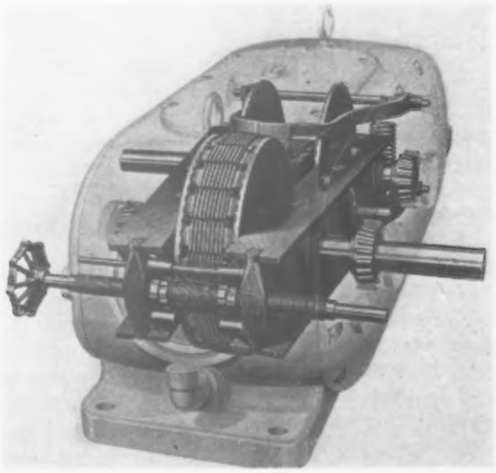
"GreaSeal" Bearing Line Is Extended

THE Norma-Hoffman Bearings Corpn., Stamford, Conn., line of "GreaSeal" felt-protected precision ball bearings has been extended to include three larger sizes —40, 45 and 50 mm. bore. The line includes three series, two of which are fully inclosed for the retention of lubricant and the exclusion of dirt and moisture. The seal consists of thick, close-fitting felts between removable plates, forming an effective labyrinth against the recessed inner ring.

Electric Pre-Heating Of Airplane Cabins

FOR the purpose of heating an airplane sleeper while in its hangar, a 9-kw. electromode electric air heater is connected to a convenient outlet while positioned in the plane cabin. Capacity is said to be sufficient to raise interior temperature from 35 to 73 deg. F. within 10 min. Thermostat control with automatic cutout is provided. Heat circulation is by fan. The equipment is built by the American Foundry Equipment Co., Mishawaka, Ind.





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"P.I.V." speed control through minute or large variations is now assembled for vertical application.

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▲ ▲ ▲ Application of Alloy

IN this article Mr. McQuaid reviews the effect of alloy additions in as non-technical a manner as is possible. Specific applications of alloys are considered, and it is pointed out just why one particular alloy analysis is more suitable than any other, even though some simpler analysis or even plain carbon steel may in a cursory examination appear to have satisfactory properties. This manuscript, in essentially the same form as it is here, was presented on Dec. 13 to assembled members and guests of the American Institute. This organization was first founded in 1812 to encourage and promote domestic industry. It has as primary aims the encouragement of the American scientist and suitable meetings and publicity to bring him into closer contact with the general public. Although the Institute has lagged in the intermediate years and is little known to the trade, from the scope of its 1936 program it is evident that an effort is being made to assume a more prominent position in steel, non-ferrous and allied industries.

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IN this discussion of the application of alloy steel, it would be difficult in the time given to do more than touch on the part played by special additions to the carbon steels and their importance. A special effort will be made to avoid a too technical discourse and to bring out as clearly and as simply as possible how much our everyday life is affected by developments in alloy steel.

In our present mechanical age, it is unnecessary to point out the part played by metals and particularly steel in everyday life. Steel is the foundation on which we must build in practically every industry, in building, in transportation, manufacture and in agriculture. We will not discuss here the obvious importance of the general use of steel, but more specifically, the part played by other elements than carbon and iron in making steels which best serve our purpose. This could be done by listing the various elements one by one, and discussing the effect of these elements singly or in groups on the properties of steel. This would be a lengthy and, I am afraid, somewhat tiresome method of discussing a really interesting subject.

It seems preferable to list those properties which are so important to us in steel and discuss how and why certain elements are important in developing these special properties.

Iron is a peculiar metal in one respect and on this peculiarity is based our present civilization. Iron changes its crystal form on heating and reverses the change on cooling, and the important thing to us is that the crystalline form obtained on heating has the power of dissolving carbon and certain carbides which are insoluble in the other crystalline form of iron, and hence precipitates out on cooling. On this fact is based our whole civilization, dependent as it is on hardened steel for its tools, its transportation, its weapons and practically every other modern need.

Metallic carbides are almost invariably hard, and some approach the diamond in hardness, such as the carbides of silicon, tungsten, tantalum, etc. Iron carbide is also extremely hard and is the principal factor in the hardening of steel. As noted before, iron assumes on heating a form in which carbon dissolves and, on cooling, iron changes to a form in which the carbide precipitates out. If the cooling is fast enough, the transformation temperature is lowered so that the carbides are precipitated in an extremely finely divided state in a relatively rigid iron mass. This results in an extremely hard material.

If the cooling takes place at a slower rate so that the transformation takes place at a higher temperature, the carbides are precipitated in a more mobile iron, and coalesce into larger particles with the result that the material is softer than before. Thus the higher the temperature at which the carbide precipitation takes place, the more coalescence and the softer the resulting steel.

Cooling Rate Reduced

It is characteristic of plain carbon steels low in manganese that the transformation temperature on cooling is difficult to depress and requires the fastest cooling rate to obtain a full hardness. For this reason carbon steels must be quenched in water and even with the best of water quenching it is difficult to obtain a fully hardened structure on a piece of more than half an inch in thickness.

By the addition of various so-called alloys, however, the transformation temperature is easily depressed so that much less rapid cooling rates are required, and fully hardened sections of considerable size can be obtained by oil quenching.

This is the primary advantage of the alloy addition to plain carbon steels, resulting in much lower stresses than is set up by the severity of the water quench with its consequent warpage and tendency

Steels

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to crack—a very important advantage in the mass production of gears and other hardened parts.

We are, in all our use of steel, interested in a few very important properties such as strength, resistance to wear and resistance to corrosion. Thus we believe that if the steel part will not break, wear out or fail by surface deterioration, that it will be satisfactory, and, of course, to these requirements must be added the important one of reasonable cost. These are properties that we are all interested in, not only in such things as steel rails and marine engines, but in our personal automobile, our washing machine, our electric sweepers and other thousands of objects of daily use.

If you compare carefully the mechanical details of the finely finished, luxurious automobile of today with what it was thirty years ago, you will be surprised not in the great improvements which have been made, but at how little change has actually been made in the fundamental design of thirty years ago. Certainly the piston and crank assembly and camshaft are little different in fundamental design. Neither is the clutch or transmission or rear axle essentially different.

Further study would develop that the improvement is in relative size and speed. The engine of today is developing much more power, primarily because of the higher possible speeds and the power transmission mechanism is relatively very much smaller in size today. This change has been brought about and made possible primarily by giving steels to the engineer which have improved properties with a much greater load-carrying ability because of increased strength and resistance to wear. Of course accuracy in manufacture has been an important factor from a purely engineering viewpoint, but improvement in materials has been the greatest single help to the automotive engineer.

We might, in analyzing how the steels which the engineer has at his command today differ from those of thirty years ago, discuss in greater detail the qualities in steel which result in improved strength, in improved wear resistance and in improved resistance to surface deterioration.

The actual static strength of steel is almost directly proportional to the hardness, if we assume that by static strength we mean the load in tension or compression which will cause actual rupture of the material. Now it can be argued, that for most parts the simpler steels consisting primarily of carbon and manganese can be made equal in hardness to steels containing the special elements which we term alloy.

Is Manganese an Alloy?

This brings up immediately the question as to when manganese is an alloy and when it is not an alloy. It was found early in the beginning of tonnage steel making that a definite addition of manganese is necessary to make possible the commercial rolling and forging of the carbon steels so that all commercial steels contain a certain percentage of manganese added primarily to control deoxidation and to insure satisfactory production in the operations of rolling and forging. The addition of manganese required for this particular purpose need not exceed one-half of one per cent so that manganese up to this percentage is always found in carbon steel and is not considered as an alloy. In fact, much higher percentages of manganese are included in what is known as commercial carbon steels, but for the purpose of this discussion we will consider any manganese added above that required for improving the processing in the steel mill as having an alloy effect.

As stated above, carbon steel containing a small percentage of manganese can be made just as hard by sufficiently rapid quench as any of the steels containing alloys and can thereby be made to produce parts having equal static strength to that obtained with the best alloy steels.

This brings up the point as to just what we mean by strength in steel, and we find that when we say that a part must not break under given conditions, we mean that it must have not only static strength but also have combined with this strength a certain amount of toughness or the ability to distribute suddenly applied loads which are met with in practice. It is indeed very rare that a condition ever exists where we are not concerned with the distribution of stress as well as high static strength.

Suppose, as a matter of concrete application, we discuss first the subject of alloy gear steels, and take as an example the gears which are used in your automobile and which represent today probably the largest single use of alloy steel. In comparing the automobile gear of today with what it was thirty years ago, we find that, for the same load-carrying capacity, it is very much smaller and very much quieter.

The gear tooth has to have sufficient strength to carry a very highly concentrated load which is in-

termittently applied and which is combined with a very high-surface sliding action. Thus we have in a gear tooth requirements which necessitate strength, hardness and the ability to carry intermittent loads which are of high frequency and relatively suddenly applied. As we intimated before, it would be possible to make the average automobile gear out of plain carbon steel, quench it in water and thereby obtain a static strength which would compare with any of the alloy combinations which we might use. We would find, however, that when we quench the carbon steel in water it would be very difficult to maintain the very carefully generated form of the gear tooth which we had after machining and that the load would be concentrated on a much smaller area and very unevenly distributed. This change in form and contact is due to the stresses set up in quenching this type of steel in water.

If we substituted for the water an oil quench which is, unfortunately, the only other drenching medium available for commercial use which is less drastic in its action than water, we would find that a gear so hardened would be much more satisfactory from the standpoint of change in form and contact, but would wear out rapidly due to the fact that it would be relatively soft. This indicates a great disadvantage of the carbon steels, in that with them it is difficult to develop in an oil quench the hardness required to insure satisfactory resistance to wear which is so important in a gear tooth.

Therefore, in order to improve the hardening characteristics of the carbon steel, we introduce into its composition another element which we say promotes deeper hardening. As noted before, one of the primary functions of an alloy addition is to slow up the speed of the transformation which is a necessary requirement to the hardening of steel. Certain metallic elements affect greatly the rate at which the transformation in steel takes place, so that by suitable additions of such elements, we can reduce the transformation rate to the point that even the relative slow cooling in oil will be sufficiently fast to obtain full hardening in the sections which we require.

It is the function of the alloy addition to depress the rate of transformation so that the change takes place at a relatively low temperature as compared to the carbon steel, thus permitting a slower cooling rate to obtain full hardness. There are, of course, several additions which could be made which would achieve exactly the same results, so it becomes necessary in our selection of alloy steel to consider various alloy combinations and to base our selection on such things as relative machinability, cost, processing expense, etc.

We find, therefore, that the primary factor in obtaining the present quiet automobile gear was the ability to quench these steels in oil rather than water, and so obtain a more satisfactory contact between the teeth in action. It is found that with any of the several alloys available, that satisfactory hardness can be obtained and in gears this is generally determined by the use of a file or one of the standard instruments for measuring hardness, such as the Rockwell, which measures the depth to which a given load will cause a standard diamond cone to penetrate.

The resistance to wear is almost directly proportional to hardness and to the presence in the contacting surfaces of such very hard structures as the carbides of iron, chromium, vanadium, etc. The presence of the very finely divided carbides which produce the greater part of the hardness obtained by quenching, determines the resistance to wear, and these carbides are very important from this standpoint.

Carbide Less Stable

The carbide of iron, which is our main source of hardness in the plain carbon steel, becomes less stable as the temperature is increased, as compared to the carbide of chromium, vanadium molybdenum, etc., and since many of our gears operate under such loads that high-surface temperatures are obtained, we find that these steels do not maintain their hardness at as high a temperature as the alloy steel and thus soften up under a load which the alloy steels can carry without difficulty.

The additions of nickel and manganese are especially active in reducing the speed of transformation and at the same time increasing the strength of the iron in which they go in solution. Nickel does not form carbides and hence is not as valuable from the standpoint of increasing the resistance to abrasion as our carbide-forming elements, such as chromium, vanadium, molybdenum, tungsten, etc.

Nickel is particularly useful in improving the hardening of larger sections, since it tends to reduce the grain size of the iron (ferrite). It not only increases the strength, but increases the toughness for a given hardness and hence it is very common to find nickel used as an addition where the maximum resistance to shock loading is required and where the masses are large.

In order to improve the hardening characteristics and wear resistance of the nickel steels, it is quite common to add to them a carbide-forming element such as chromium or molybdenum, so that a very common specification for parts which must not only have strength and toughness but also wear resistance is to find nickel in combination with chromium or molybdenum.

It is interesting to note, however, that in automotive gears, in the transmission particularly, the main requirement is resistance to wear, the shock load being virtually absent. Hence every effort is concentrated in these steels on obtaining maximum surface hardness combined with minimum distortion. For this reason one of the commonest alloys applied to transmission gears is the straight chromium steel with relatively low carbon which has been heated in a cyanide bath so that the surface layers can absorb nitrogen to form the high nitrides which are so satisfactory for resisting wear in these steels.

It would be interesting to cover some of the important parts of an automobile, as well as other commonly used mechanisms, and note where alloy steels have been an important factor in their development. One of the most important factors in the development of the present-day automobile has been the use of special alloy steels in the valves, and it might be said that the development of valves having long life under the extremely difficult working conditions which exist in automotive and airplane motor service has been one of the greatest contribution of the metallurgist.

It is certainly true in the airplane motor that the greatest single improvement was the development of the airplane motor valve to the point where interrupted motor life could be safely predicted for many

times the life which was considered satisfactory in 1918.

The alloys which give the gasoline motor valve its stability at high-working temperature are primarily chromium and silicon, although tungsten, nickel, molybdenum, vanadium, etc., are used to some extent. In addition to the development of the heat-resisting valve, we have the development of the inserted valve seat made from this same type of alloy. These developments have resulted in the reduction to an unimportant minimum of the problem of valve grinding and decrease in efficiency, due to poorly seated valves.

Alloys are added to gasoline-motor-cylinder blocks with considerable increase in the length of life of these important parts of the motor, and have helped to increase greatly the operating service between the shut downs for motor-block regrinding. Alloys usually added to the cylinder block to improve the life are chromium, nickel and molybdenum. Crankshaft, connecting rods, camshafts, etc., are still made, as a rule, from the plain carbon types of steel. But the practice which has developed the alloy steels to their present satisfactory position has also resulted in a greatly improved carbon steel which, fortified by increased additions of manganese and some small additions of chromium, etc., have been found satisfactory for many parts where the carbon steel of twenty years ago would have been unsatisfactory.

The use of alloys in gear steels has been touched on before, and their use has resulted in a practically negligible percentage of gear failures or rejections for noise. In axle shafts and steering-gear parts, the alloy steel is practically universal except in the case of one large user who has developed a special technique of quenching with a special design which permits him to use a rather closely controlled type of carbon steel.

The present heavy-duty service in trucks, buses, etc., has only been made possible by coordination of design and alloy steels which provide not only the requisite strength required by the engineer but also the necessary ability to distribute stresses so that localized failure does not occur. The developments of alloy steels combined with an improved melting practice has reduced to a minimum the losses due to axle shaft failures as well as steering-gear breakage in service, with the result that in passenger-automobile service failures are almost unknown.

Alloys for Railroads

In the field of heavy transportation, which includes the railway and steamship service, alloy steels have not yet reached a comparative position with that which they hold in the automotive industry. This is partly due to the heavy masses involved where the designer, in order to get sufficient stiffness and weight, has designed parts in which the working stresses have been well within the limits of carbon steel properly made and treated. There are, of course, many railway applications today for alloy steels from low-carbon-nickel alloys for staybolts to special chrome alloys for super-heater tubes. Locomotive axles are quite often made from nickel steels, not because of the additional strength obtained, but because of the decreased tendency with this alloy to check or crack when subjected to the sudden change in temperature which exist in locomotive main bearings.

In the construction of our ships we find there are also many uses for alloys, although not as large as would seem to be indicated by their position in the automotive fields, ranging from copper molybdenum iron for salt-water piping to high-chrome-alloy steels for turbine blades. While these may seem small items, it is interesting to note that some of our large marine turbine installations require as much as 6000 ft. of special cold-drawn 13 per cent chromium stainless steel.

In ship construction as well as in transportation, it is the alloy steels which have applied the answer to the problem arising from continual failures of certain parts which resulted in interrupted service and high losses in income.

The aircraft field is, of course, almost 100 per cent dependent upon alloy steels, most of the ships being constructed from chromium molybdenum alloy tubing which has the specific advantages of being easy to fabricate and having excellent welding properties as well as excellent physical properties when air cooled. Practically every part of the airplane motor from crankshaft to propeller hub is made from alloy steel with the notable exception possibly of the valve springs.

It is interesting to note at this time that in the field of springs that the carbon steels with some slight modification are commonly used in preference to alloy steels. When we think how important springs are in our daily life and how difficult it would be to eliminate them from our design, we begin to realize that carbon steel, when properly made and treated, has extremely valuable properties.

Spring Steels

Long papers have been written on the subject of valve springs alone, and also on spring materials, and it is difficult at this time to refrain from noting the high standing of carbon steel in this important part in our mechanical age. It is certainly true that in the transportation field, particularly, the successful and continuous performance of practically all the equipment depends on the satisfactory action of springs.

Springs are made from carbon steels, as a rule, primarily because in the usual spring section it is possible to obtain satisfactory heat treatment of the carbon steels. Since springs are functioning continually within their elastic ranges, they are seldom subjected to an overload beyond this range. Since it is possible to obtain satisfactory quenching with the carbon steel, the addition of the alloy would have very little advantage. In fact, it has been found that certain alloys such as nickel and copper rather than improving the carbon steels for springs actually decrease the satisfactory performance.

In the field of tools which are so essential to our daily life, we find that in hand tools the carbon steels of special treatment are the most common, and that little alloy is used in such parts as chisel, files, axes, etc. In cutting tools for machine production, such as lathe, planer, milling and shaper tools, the alloy steels are practically universal. The alloys most commonly used are those which form the most stable carbides and which require a high temperature for their solution. Of this group the tungsten, chromium, molybdenum and vanadium alloys are the most commonly used, generally in combination. These stable carbide combinations will retain their hardness at high temperatures, and hence permit much higher speeds and heavier cuts.

The development of this type of

steel for cutting tools represents one of the most important contributions of the metallurgist to our industrial advancement.

Another more recent contribution has been the development of the hard carbide in a cutting tool, not as a finely divided precipitate in a high alloy steel, but as a composite of carbide particles bound together in a matrix of cobalt almost similar to the manner in which a grinding wheel is built up. Of these carbides, the tungsten and tantalum are the best known and provide tools capable of cutting materials as hard as glass. In fact they have been used to turn glass to demonstrate their hardness.

One of the really important contributions to our every day life has been the revolution in deep well drilling speed of almost five hundred per cent, with the result that our oil production rate has kept well up with the increased consumption, something almost impossible without the hard faced tools. This has prevented a greatly increased price of gasoline which is of direct interest to us all.

One of the most interesting and important alloy developments has been the use of copper and molybdenum in open hearth iron to decrease greatly the losses in sheets, etc., exposed to atmospheric attack. This has undoubtedly resulted in savings of millions of dollars to those who must maintain such sheets, etc.

The more highly alloyed, iron base alloys comprising the so-called stainless steels and heat resisting metals have already created a place in our daily life as is evident from even a casual observation. Kitchen knives and kitchen ware are common applications of stainless steel, the bright trim on our automobile store fronts and even the ornamental trim on our large buildings are also common applications.

Many pages could be devoted to this particular field of alloys which have become so important in industry as well as in our daily life. In oil refineries, on our new streamlined trains, on buildings such as the Chrysler and Empire State, in the food industries, etc., the corrosion resistant alloys are finding an ever widening application.

Time does not permit more than an extremely sketchy outline of alloy steel applications. No effort has been made to compare one alloy with another, although many pages could be written on this subject alone. The every day alloys, the ones we hear of the most often, are nickel, chromium, manganese, tungsten, vanadium, silicon and molybdenum, but probably no addition has a more important place in our steel picture than aluminum.

Aluminum today is almost universally used as a steel addition, generally in quantities not exceeding 0.20 per cent. Yet this small addition has a most important bearing on the hardenability characteristics and on the ability to distribute rapidly applied stesses. Sulphur, titanium, columbum, silenium, etc., appear to have specific advantages, when applied to certain steels.

The effect of nitrogen, hydrogen and other gases is just beginning to be studied with promise of important results in our control of steel making.

In conclusion it would be well to touch upon the improvements which have been made in the production of carbon steels in recent years by controlling the deoxidation practice and ladle additions to produce in carbon steel a greatly increased ability to distribute stress and to harden with minimum warpage. This improvement in carbon steels which involves the control of hardenability characteristics when combined with a small increase in the manganese and other cheaper alloys produces steels which, in their properties, compare favorably with the lower alloyed grades.

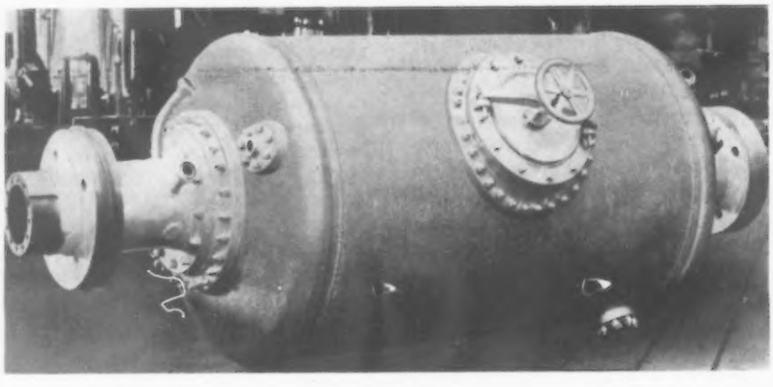
There is no doubt but what the near future will see a much wider use of the lower carbon steel with increased manganese and chromium, depending upon an improved technique in melting practice for their greatly improved toughness and ability to harden with minimum distortion.

Stainless Clad Steel Is Used For Large Cereal Cooker

WATEROUS, LTD., Brantford, Ont., has recently secured from a large cereal manufacturer an order to construct a second cereal cooker of stainless clad steel. The first cooker of this type was constructed in the fall of 1933 and was a radical departure from building these cookers of ordinary mild steel, as had been the former practice.

The cookers, approximately 6 ft. long by 4 ft. in diameter are of the revolving type, the cereal being cooked by live steam in the presence of salt. In an effort to secure added sanitation and longer life stainless clad steel was specified as a trial unit.

After more than a year in service the cereal manufacturer has now ordered a duplicate unit to be constructed of the same material, IngAclad 18-8 stainless clad steel, as produced by the Ingersoll Steel & Disc Co. Division of Borg-Warner Corpn., Chicago. The combination of wet cereal, salt and steam has shown no corrosive action on these cookers having a complete stainless interior surface. The cooker shells are of all-welded construction.



An Approved Method for the Determination Of Aluminum and Alumina in Steels

THE 1935 Campbell Memorial Lecture by H. W. McQuaid, presented in THE IRON AGE of Oct. 10, was a detailed review of the importance of aluminum additions in modern commercial steels. Mr. McQuaid also discussed the effect of aluminum on deoxidation and grain size and mentioned other characteristics of commercial steels containing aluminum in excess of that added as a deoxidizer. In performing this experimental work, it was necessary for the Republic Steel Corpn. laboratories to develop improved methods of analyzing for aluminum and alumina. Following the publication of the lecture, there was a considerable demand for this analyzing procedure, and THE IRON AGE herein presents the detailed method in response to this demand. The exact chemical manipulation is so carefully followed through, step by step, that no laboratory should have difficulty in turning out equivalent analyses.

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THE detailed study which has been made during the past ten years of the factors in steel making which affect the characteristics of the finished product has indicated the great commercial importance of oxidation control in steel making. The work of many investigators, not only in this country but abroad, has indicated the important part played by additions intended to control final deoxidation in the making of steel to meet modern requirements.

The efforts to obtain definite knowledge of the relations between the composition of the slag and the composition of the bath have indicated how very important very small additions of such elements as aluminum, vanadium, etc., play in the quality of the finished product.

Aluminum, due to its relatively low cost and its affinity for oxygen, has become one of the most important additions in the making of special requirement carbon and alloy steels. Because of its extremely great affinity for oxygen, the effectiveness of the aluminum addition is very greatly determined by the condition of the bath to which the addition is made. It has become important to know in what condition the aluminum exists in the steel after solidification of the melt, and hence it is important that an accurate method of determining the amount of aluminum present be available.

Data given in the 1935 Campbell Memorial Lecture indicated that a knowledge of the metallic aluminum in a given heat of steel offers an indication of the hardenability characteristics of the finished steel, and hence the desirability of an accurate method of analyzing for aluminum. The lack of accuracy of previous methods of analysis of aluminum and alumina has caused considerable difficulty in the interpretation of results.

In developing a method of analysis of aluminum in connection with the 1935 Campbell Memorial Lecture, it was necessary to investigate thoroughly the present used methods and much work was done to develop a more accurate and reliable method of analysis of aluminum and alumina in steel.

A survey of literature revealed a great number of methods of analysis, the references to which are given in the appended bibliography. Several hundreds of determinations have been made by means of nine selected methods of analysis of aluminum and alumina in steel. The following method of analysis was finally adopted as being the most accurate and comparatively shortest for all steels except stainless. With future increasing interest in aluminum and alumina in steel, the steel maker may be called upon to furnish with the regular chemical analysis also the aluminum and alumina analysis. According to this method, practically the same time is required to determine the aluminum and alumina content as is required to find the molybdenum content.

Determination of AL_2O_3 in Steel

Ten grams of drillings are dissolved in 100 cc. of HCl (1-2). Heat gently at a temperature of 70 deg. C. to 80 deg. C. until the sample is dissolved. Filter through a Whatman No. 42 paper and wash with dilute HCl (1-20), hot H_2O, a hot 3 per cent Na_2CO_3 solution, then HCl (1-10) and hot H_2O. Reserve the filtrate (a) for the determination of aluminum.

Ignite the paper and residue, cook, dissolve in 20 cc. HCl (conc.) and heat until all oxides, except silica, are in solution and oxidize with 10 cc. HNO_3. Cool, add 20 per cent solution of NaOH until alkaline and then 40 cc. in excess. Dilute to about 200 cc. with H_2O and boil for 15 min. Let stand for at least two hours (over night preferred). Filter through a double Whatman No. 42 paper. To the filtrate add 15 cc. Br water and boil for 5 min. Remove from hotplate and add HNO_3 until acid, then NH_4OH until alkaline, and 6

drops in excess. Boil for 1 min. (steels of low Al_2O_3 content sometimes require more than one minute of boiling to bring down the $Al(OH)_3$). Filter through a Whatman No. 42 and a little ashless pulp. Wash 5 times with hot H_2O containing a few drops of NH_4OH. Place the precipitating beaker under the funnel and wash the $Al(OH)_3$ through the paper with hot HCl (1-1). Reprecipitate, filter, and wash as before. Ignite the papers from the two precipitations in a platinum crucible and volatilize the silicon with one drop H_2SO_4 and 5 cc. HF (depending on the silicon content). Ignite at a high temperature and weigh as Al_2O_3.

Run blank on solutions,

$$\frac{(\text{Weight})\ (100)}{10} = \text{Per cent } Al_2O_3$$

Determination of Metallic Aluminum in Steel

Ten (10) gm. of drillings are dissolved in 100 cc. of HCl (1-2). Heat gently (70 deg. C. to 80 deg. C.) until sample is dissolved. Filter through a Whatman No. 42 paper. Discard residue and paper if Al_2O_3 is not desired.

TABLE I

Chemical Analysis of Experimental Heats

Heat No.	C	Mn	Si	P	S	Al	Al_2O_3	Nitrogen
				Group 1				
0.24	0.40	0.91	0.12	0.012	0.019	0.012	0.019	0.0140
522	0.40	0.95	0.15	0.011	0.030	0.032	0.030	0.0137
122	0.40	0.88	0.18	0.014	0.020	0.026	0.028	0.0142
222	0.37	0.70	0.17	0.013	0.022	0.098	0.020	0.0068
323	0.36	0.74	0.15	0.013	0.028	0.117	0.026	0.0068
422	0.37	0.72	0.17	0.020	0.025	0.204	0.023	0.0074
				Group 2				
022	0.335	0.45	0.16	0.011	0.029	0.017	0.022	0.0135
521	0.33	0.44	0.19	0.014	0.023	0.013	0.027	0.0097
121	0.325	0.39	0.20	0.019	0.027	0.016	0.026	0.0091
221	0.38	0.44	0.12	0.016	0.023	0.015	0.044	0.0137
322	0.37	0.44	0.15	0.009	0.028	0.055	0.040	0.0132
411	0.26	0.41	0.09	0.009	0.020	0.173	0.029	0.0142
212	0.26	0.49	0.17	0.006	0.022	0.120	0.053	0.0124
421	0.35	0.40	0.15	0.015	0.028	0.129	0.037	0.0115
312	0.26	0.42	0.17	0.020	0.020	0.156	0.034	0.0153
				Group 3				
015	0.245	1.05	0.14	0.022	0.027	0.011	0.013	0.0111
115	0.245	0.94	0.23	0.011	0.024	0.032	0.022	0.0110
014	0.262	1.01	0.14	0.017	0.021	0.018	0.024	0.0190
513	0.27	1.10	0.19	0.014	0.023	0.024	0.027	0.0196
116	0.26	1.00	0.14	0.013	0.027	0.024	0.016	0.0196
413	0.26	0.95	0.25	0.010	0.025	0.156	0.060	0.0104
				Group 4				
118	0.25	1.14	0.18	0.023	0.070	0.024	0.018	0.0185
117	0.24	1.03	0.20	0.020	0.090	0.038	0.025	0.0091
114	0.26	0.89	0.15	0.012	0.125	0.048	0.032	0.0089
				Group 5				
223	0.49	1.49	0.18	0.012	0.023	0.130	0.035	0.0146
324	0.49	1.44	0.18	0.013	0.026	0.124	0.054	0.0144
423	0.49	1.41	0.25	0.012	0.024	0.046	0.050	0.0121
				Group 6				
021	0.39	0.82	0.15	0.023	0.025	0.012	0.022	0.0123
523	0.38	0.85	0.13	0.015	0.028	0.011	0.020	0.0115
123	0.39	0.80	0.15	0.023	0.028	0.015	0.013	0.0111
				Group 7				
213	0.12	0.54	0.19	0.012	0.024	0.020	0.044	0.0114
412	0.12	0.51	0.16	0.009	0.025	0.047	0.024	0.0128
313	0.12	0.46	0.26	0.012	0.022	0.110	0.045	0.0119
111	0.16	0.18	0.03	0.006	0.021	0.019	0.035	0.0107
211	0.19	0.22	0.03	0.012	0.024	0.014	0.044	0.0115
321	0.32	0.26	0.03	0.006	0.023	0.120	0.025	0.0190
013	0.21	0.76	0.19	0.022	0.022	0.035	0.006	0.0124
512	0.204	0.64	0.18	0.012	0.025	0.046	0.030	0.0114
113	0.21	0.54	0.17	0.022	0.022	0.017	0.013	0.0120
012	0.20	0.39	0.15	0.010	0.026	0.014	0.018	0.0107
311	0.19	0.33	0.18	0.018	0.026	0.048	0.048	0.0111
023	0.32	0.29	0.17	0.018	0.026	0.017	0.012	0.0059

To the filtrate, add 10 cc. of a 20 per cent solution of $(NH_4)_2PO_4$ and NH_4OH until a precipitate almost forms, then add dilute NH_4OH (1-30) until a slight turbidity appears which does not dissolve on stirring. Clear with a few drops of HCl and add 2 cc. excess. Dilute to 300-400 cc. with H_2O and bring to a boil. Add 35 cc. of a 30 per cent solution of $Na_2S_2O_3$ and 15 cc. acetic acid. Boil for 15 min. and filter off Al PO_4 on a Whatman No. 42 paper.

This precipitate must be purified. Ignite it; then dissolve in 25 cc. HCl (conc.) and oxidize with 10 cc. HNO_3. Cool, add 20 per cent NaOH solution until alkaline, and then 40 cc. in excess. Dilute to about 200 cc. with H_2O and boil for 15 min. Cool, dilute to exactly 250 cc. with H_2O. Let stand several hours (over night preferred). Filter off exactly 125 cc. (5 gm. of sample) in a 400 cc. beaker and add 15 cc. Br water. Boil for 5 min. Remove from hotplate, make acid with HNO_3 and then alkaline with NH_4OH to 6 drops excess. Boil for 1 min. Filter through a Whatman No. 42 paper and wash with hot H_2O containing a few drops of NH_4OH. Dissolve by washing hot HCl (1-1) through the paper and reprecipitate, filter, and wash as before. Ignite, volatilize silicon with 1 drop H_2SO_4 and 1 cc. HF. Ignite at a high temperature and weigh as Al_2O_3.

Run blank on solutions,

$$\frac{(\text{Weight})\ (0.5303)\ (100)}{5} = \text{Per cent Aluminum}$$

The results obtained with this method are given in Table I.

Recovery of Aluminum Added

The per cent aluminum analyzed was less than that added. Alumina gradually increased with increase in alumina addition up to all aluminum added equivalent to 2 lb. per ton steel, remaining practically constant with greater amount of aluminum added. On the other hand, metallic aluminum slowly raised, to increase abruptly, when aluminum additions greater than 2 lb. per ton of steel were made.

A general average of all results showed that a recovery of 90 per cent of aluminum added is possible. That is, total aluminum, metallic and as alumina. This efficiency may also be expected with aluminum additions to open-hearth steel in the ladle. Table II

shows examples of aluminum recovery.

Comparison of Different Methods of Analyses

In order to compare different methods of analyses, several results are given in Tables III and IV.

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TABLE II

Comparison of Per Cent Aluminum Added and That Analyzed

Heat No.	Per Cent Al Added	Per Cent Al	Per Cent Al_2O_3	Total Aluminum Calculated	Per Cent Efficiency
523	0.0223	0.011	0.020	0.0216	97
115	0.0446	0.032	0.022	0.0436	97
211	0.0892	0.048	0.044	0.072	80
323	0.1338	0.117	0.026	0.1308	96
423	0.1784	0.130	0.050	0.1564	87

TABLE III

Comparison of Chemical, Electrolytic and Spectroscopic Methods of Analysis of Aluminum in Steel

Heat No.	Per Cent Al Added	Per Cent Al	Per Cent Al_2O_3	Total Al Calculated	Melaven Cell Per Cent Total Al	Spectroscopic Per Cent Total Al
523	0.0223	0.011	0.020	0.0216	....	0.02
115	0.0446	0.032	0.022	0.0436	0.033	...
122	0.0446	0.026	0.028	0.0410	....	0.03
323	0.1338	0.117	0.026	0.1308	0.078	...
423	0.1784	0.130	0.050	0.1564	0.149	...

TABLE IV

Comparison of Two Different Chemical Methods

				—Cupferon Method—	
Heat No.	Per Cent Al Added	Per Cent Al	Per Cent Al_2O_3	Per Cent Al	Per Cent Al_2O_3
521	0.0223	0.013	0.027	0.004	0.025
117	0.0446	0.038	0.025	0.008	0.026
223	0.0892	0.046	0.035	0.022	0.035
313	0.1338	0.110	0.045	0.040	0.046
413	0.1784	0.156	0.060	0.104	0.067

▲ ▲ ▲ The Pressed Metal Industry

BEFORE the history of the pressed metal industry is brought up to date two other factors in its development must be considered; the World War and its aftermath, the depression. Pressed metal was but a scant half way into its automotive phases when the God of War descended upon all industry with breathless and undeniable demands. Small arms ammunition was already a legitimate function of the power press but available equipment for its production in the quantities demanded was a drop—not in a bucket but in a barrel. Automobile production was groping toward the efficiency of today but automobiles; trucks, passenger cars, tractors; were vital in quantities and at a speed of production far beyond what the gears then in mesh could handle. Light artillery ammunition had become the big brother of the small arms variety, with similar brass cases, and if quantities ran only to hundreds of millions instead of the billions of the latter the tax on press manufacturers to produce necessary equipment was severe enough. Shrapnel shell forgings had belonged to the hydraulic press but it was too slow and power presses were extensively used.

These were but major requirements. About everything of metal a soldier used or needed in his service of supply involved the use of presses in greater or less degree. His helmet and gas mask were press productions. He escaped being loaded with bullet-proof vests only because, after serious consideration, reversion to the pressed metal industry's earliest product was decided useless. But everything else, from shoe eyelets, buttons, buckles and bayonet scabbards up were needed suddenly and in such increased quantities as to drive the press builder mad.

As when oil cans became the rage upon the rush of petroleum, so food containers of tin for rations of all kinds must be produced literally from Kalamazoo to Kamchatka and in hitherto unheard of quantities. Presses for tops and bottoms and corollary machines for making bodies and assembling and closing completed cans taxed every source of supply. Equipments for complete canning plants were built, shipped to the agricultural production centers of this country and to far corners of the world (one actually went to Kamchatka) and so much of the world as was not active otherwise began to build up the food reserves necessary.

New War Implements

A complete list of the items directly used in warfare, the production of which required power presses for one or more operations would probably be an impossible task. To all the things common in war prior to 1914 there were added new developments or adaptations by the hundred and no other machine tool could fabricate them or at least their essential parts so rapidly, accurately and satisfactorily as the power press. Gas masks were by no means unknown before the war. At its outset the metallic mouthpiece was made of cast metal and occasionally men died because castings are more or less porous and may contain air holes or fissures that admitted gas-polluted air at the wrong spot. Pressed metal engineers "redeveloped" these and gave the army safer gas masks.

The Paravane was an example of a new development. Farragut's gallant "Damn the torpedos, full speed ahead!" was the justifiable order of an officer who could pretty accurately estimate the chance of disaster. Perhaps it was more than paralleled many times in the Great War but science and invention provided a protective device fashioned somewhat like a small and very "hard boiled" airplane. A pair of these, towed by steel cable "bridle reins" from the cutwater of a ship, assumed positions far outward on either side and at depth equaling the ship's keel. Anchored mines were fended to right or left and their anchor cables neatly clipped by the shark-like teeth in the snout of the Paravane. Its fabrication was a pressed metal job.

The dirigible airship, the airplane, the aerial bomb, all furnished work for the versatile press. Air, land and sea called insistently to the makers of equipment and its users, and they responded. Factories that had never included presses in their equipment added them as necessities. Factories that had produced pressed metal parts on contract for other manufacturers expanded tremendously. Factories with an established output wholly or largely fabricated on presses were called upon to produce items by hundreds of thousands or millions which they had never dreamed of making. New contract stamping concerns were organized, equipped and thrown into the tense arena of war.

The industry, in its modern power phase, was but ninety-three years old when the Great War ceased. From the first power presses it had progressed, slowly at first, then more and more rapidly until, with a tremendous burst, it had become, in 1918, one of the most vital mechanical factors in the economics of both civilization and the barbarism (if you will) of war. It is not too much to say that, if the complete obliteration of one industrial machine tool could stop war, production engineers could select the power press as the

Part 3---From the World War to the Present

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By O. P. HATTON

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one most certain to achieve that result.

The Aftermath of War

The converse proposition, however, did not prove true. The end of war did not stop the pressed metal industry. True the almost instantaneous cessation of a tremendous abnormal demand gave it a terrific body-blow and began for it a special and private depression. For the manufacturers of its equipment, who formed a section of the so-called durable goods industry, there was gloom indeed. Orders for new equipment were cancelled. The foundries, forges and machine shops devoted to producing presses became so nearly idle as to cause their owners deep concern. The contract stamping plants and those in which were installed a substantial portion of equipment for pressed metal operations found that the cancellation of Government contracts either directly or indirectly halted a large percentage of such work.

Peace seemed to be more destructive to an organization geared for war than had war been to the organization for peace. A huge plant for the production of rifle and pistol cartridges stood, barely completed, when the armistice was signed. It contained a thousand power presses of which three-quarters had not yet been uncrated. It was a long time before their shafts began to rotate in profitable employment. So far as the press manufacturer was concerned business was bad, and likely to continue so for a long time. His salesmen, whose smallest wares might be priced at close under one thousand dollars, were laughed out of court by the rare buyer who could easily pick up a practically new machine for less than a tenth of that amount. Indeed this portion of the durable goods industry found its private depression just a prelude to the general one of a decade later.

THIS is the concluding article in the author's dramatic presentation of the pressed metal industry, from infant to present day maturity.

The Beginning of a Peaceful War

To the pressed metal industry, the users of equipment, the blow was hard but to most of its members it was just another form of war. There were fatalities to be sure, but a very considerable portion of the industry shook itself, dashed the sweat from its eyes and began to look about for its new enemy. That enemy was any man who said, "It can't be made of pressed metal." The lessons learned under war-time pressure were now to be applied to the further improvement of peace-time production. The army was there; engineers by the hundred who had been called upon to make millions of this or that where only hundreds or thousands had been required before. The equipment was there for this new war; swift little machines that could do five or six important things at one time and all at the rate of three hundred to six hundred per minute. These were the army's machine guns. Its heavy artillery needed only the turn of a switch to challenge the man who believed the thing he needed was too big and heavy to be made from pressed metal.

In 1921 very few producers of things useful in substantial quantity were safe from the intrusion of determined men who said, in effect, "See here, old chap, you're making this thing all wrong! I can produce a better one from pressed metal for half the price you are now paying." Men went about picking up articles in stores, considering, weighing, deciding this or that part could be made thus and so or seeing, with some flash of genius, how the whole thing could be changed and made better. An engineer looked up at the sign on a factory making simple household necessities, wondered what it might hold to be redeveloped and came away with the germ of the transition from clumsy wood to the neat, efficient pressed metal floor mop most housekeepers use today. The sign had mentioned only a floor cleaner.

It was a fertile field. The leaders in such work as this were fortunate. It was not impossible for one of them to discover something costing a dollar to make, redesign it for pressed metal, produce it for half the original cost and still make one hundred per cent profit. Perhaps it is superflous to point out, to those who might grieve over such unseemly profit percentages, that neither the maker nor the seller retained them long. As one eminently able in the ways of redeveloping remarked, "We were not only educating our customers but also our competitors. The whole country was becoming pressed metal 'conscious'."

The Fruits of "Redevelopment"

This period was responsible for many interesting improvements. Kitchen sinks had passed through various stages—wood, painted or metal lined, black cast iron, soapstone, to enameled cast iron. The pressed metal industry took them over. Monel metal and other stainless alloys were stamped into seamless and very attractive and effi-

cient household necessities. Light steel, drawn to shape is replacing cast iron for the enameled variety, and the end is not yet. Washing machines, at the close of the war were pretty crude, compared with the modern article. Their tanks were chiefly of copper for quite a time thereafter. Then a pressed metal engineer found a washing machine manufacturer who would listen to reason and there was produced a drawn steel tank beautifully enameled in spotless white. But there was no frantic rush by all other producers of washing machines to adopt the new idea. It took a surprisingly large advertising budget, a considerable period of time and a stiff rise in the price of copper to bring them the present almost unanimous agreement on that point.

During this period, too, there were transitions, here and there, whereby the so-called contract stamping plants—firms that made parts or the simpler completed articles on contract for others to sell — became manufacturers. They simply adopted, produced and marketed some branded or staple article.

This was an adventure of sorts for those who adopted it, for it shifted their sales effort from other manufacturers to the jobber or the retailer. Few if any went direct to the consumer, though a very few spent large advertising appropriations to popularize their lines and create consumer demand. Cabinet kitchen sinks, previously mentioned, are a striking example of this procedure. The expedient did not take those using it wholly out of the contract stamping class but did produce a sort of economic fly wheel or "bread-and-butter" occupation to carry a portion of the load and steady the fluctuations of their original business.

Transportation Progresses

The automotive and airplane industries continued their demands. The automobile manufacturer has never and is not likely ever to provide in his own plant every pressed metal part needed. His requirements have been distributed among the contract stamping firms and, though diminished in quantity by the general depression, have helped many to weather the gale. During the war and post war days a high degree of specialization was developed among the contractors serving automotive production. A firm might be producing the side rail and cross frame members for the chassis of two or three well-known cars. Another devoted itself wholly to wheels, others to bodies. Here one would major in forming rear axle and differential housings, while a host of firms prospered on contracts for smaller items by the hundred thousand.

Air transportation has not yet reached the mass production stage but there are already many elements in airplane construction required in sufficient quantities to make power press production profitable and there are still others that must be produced in dies on presses even though the quantity be so small as to make cost seem abnormally high in comparison to that of automotive units of similar class.

Rail transportation had been among the substantial users of pressed metal products. Pullman cars and day coaches had made use of various items formed from sheet metal. Freight cars, almost from the adoption of steel in their construction, had furnished a market for the output of presses. The whole end of a standard steel boxcar had been produced by this means from a single sheet. Its latest development, the streamlined train, is produced largely by stamping firms that were originally in the business of producing automobile parts of sheet metal, with collaboration from numerous other industries—many of which employ power presses in their own special lines.

Depression's Havoc

The depression has, of course, played havoc with the industry in general. It has cut consumption in many if not all lines on which pressed metal workers depended for a living. Plants have been run on part time. Some have been and still are in the hands of receivers. Here and there plants have been liquidated. New England, godmother of all our mechanical industries and mother in her own right of the pressed metal industry, began to lose her baby before the depression struck. Located far from the source of raw materials and also the greatest market for its product because the automotive and other heavy mechanical industries moved westward, New England was already going through a period of readjustment. She could not freight sheet steel from its place of origin, fabricate heavy products and return them to the same locality on an economic basis. In brass and other nonferrous metals she still retained the lead, for brass items are usually of small size and long experience plus a high development of automatic production counted. New England operators were, before the depression, trimming their sails to the prevailing wind, fighting with fair success to retain production of a fair share of smaller steel items as well as brass.

The depression has not helped but one phase has tempered its own severity. The pressure of depression conditions stimulates the inventive genius of humanity. The man who has been producing something to sell for a dollar finds he can no longer make a living. He turns to the ten-cent class, and either gives to some old stand-by a new shape or function or produces a brand new gimcrack or novelty with sales appeal, and thereby keeps the wheels moving. One has only to examine the present-day stocks of the "five and tens" and the variety or novelty shops to realize that hundreds of newly useful, interesting or novel things have been born. It is logical that, if they be of metal, the power press will be found parent to the greatest number for it is mass production exemplified. Even the thing not primarily of metal may call a pressed metal auxiliary to its aid. The man who buys, for ten cents, a pair of rubber soles wherewith to reinforce leaky shoe bottoms pays a minute fraction of a penny for the operation of a power press. He gets, with the soles, a scraper of tin to roughen and clean the leather and a tube holding cement. Tube and scraper are power press products. Probably both came from New England.

The depression-born ills of the industry are no greater than those of most others. Nor has its New England section been the only sufferer. It is specifically mentioned only because it had specific ills. Throughout the country pressed metal firms have gone out of business. Not this but the number and activity of those remaining is surprising. They are the ones that have created new things in tune with the progress of the times or rendered superlatively good service to such meager demand as persisted; or those that have doggedly held a balance between decreased demand and production

costs. Some of these latter have cleverly managed to keep above the red line on jobs involving but a few hundred items where thousands were formerly considered the minimum possible.

The Future

There need be no fear that the pressed metal industry will not, in due time, again be prosperous. People have become too accustomed to the use of "a number of things" that only this industry can give them at a practical price, to do without them and the attendant activity of their production. So nearly a fundamental part of our present civilization has the power press become that its every advance in its own line of progress is an aid to the solution of our present difficulties.

Recently a query was put by the head of a pressed metal firm: "If you had money to invest, what reason could you find in favor of investing in this kind of business?" A hundred other men, each in a different business, might have asked this same question on the same day, and felt as this man did. Though he may not have seen it quite clearly he had the answer in his own experience. A firm with long record in the industry, producing an adopted staple with the appeal of patented superiority of its kind. A reputation that, with the aid of persistent sales effort brought sufficient contract work to gain at least bread and butter for its personnel — and the future ahead.

The pressed metal industry has no serious problems to solve save those common to all highly productive processes.

Uniform Procedure Proposed for Qualifying Welding Operators

A COMMITTEE of the American Welding Society has been appointed to correlate relating to tests of welding operathe requirements of existing codes tors. It is now well established that a welding operator will normally be inclined to perform welding of a quality as good as his training and ability permit for any particular process and type of filler metal, states the society's announcement. A difficulty most commonly encountered in establishing suitable qualification tests for welding operators is the fact that all such tests of operators are to a greater or lesser extent tests of the welding process as well.

It has seemed advisable, therefore, to divide the Code into two parts as follows: Part I, Qualification of the welding process and procedure for any group of materials and conditions; and Part II, Testing of the welding operator to determine his ability to properly apply the above qualified process and procedure.

The committee is now engaged in providing under Part I for adequate methods of qualifying the various fusion welding processes and procedures. But at this stage of its work the rules will be limited to the welding of ferrous metals, principally the non-alloy steels having a carbon content not exceeding 0.35 per cent. It is the intent of these rules to provide that the tests covered by Part I shall constitute merely an initial qualification of the process and will not require repetition if the conditions involved are not changed.

With the qualification of the process established as provided for in Part I, it will be the interest of these rules that welding operators who are to operate thereunder need only submit to a brief and inexpensive set of check tests, the purpose of which is to determine their ability to satisfactorily apply the established process. Care has been taken to remove from this phase of the qualification procedure any tests that may be considered tests of the process rather than of the operator. The committee will submit the proposed procedure as a tentative set of rules, and general criticism will be invited.

Training Men for Supervisory Jobs

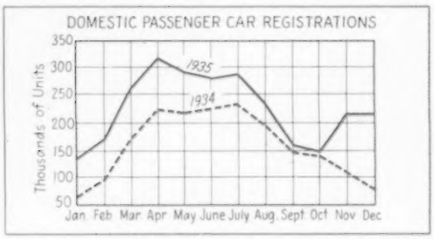
THE growing attention being given to employer-employee relations has led the Policyholder's Service Bureau of the Metropolitan Life Insurance Co. to make a survey of the training practices of 85 differentiated companies, as they apply to men in supervisory capacities. Foremen and other supervisory employees, because of their key position between management and the rank and file of the organization, are being methodically trained in most cases, though methods vary.

Analysis of the training methods of the 85 companies shows that there are three main objectives: (1) Providing foremen with an opportunity to acquire information, (2) helping them to think clearly about their jobs, and (3) developing ability in doing what is required of them.

The essentials for success in a program of training, according to the report, are active interest from the management, a competent leader, a carefully selected group, and practical subjects for discussion. Methods of planning a training program and the costs involved are also treated by the report. Copies are available on request to the company, 1 Madison Ave., New York. "Training Supervisors and Key-Men" is the title of the study.

Preliminary figures issued by the Canadian Dominion Bureau of Statistics at Ottawa indicate that in the first nine months of 1935 Canadian coal production totalled 9,398,829 tons. Production of copper was 312,520,346 lb.; lead, 242,462,157 lb.; and zinc, 235,002,032 lb.

Toledo Synthetic Products, Inc., Toledo, Ohio, maker of Plaskon molding material, has changed name to Plaskon Co., Inc., effective Jan. 1.



THIS WEEK ON THE

Automobile Assemblies Pass 100,000 a Week—Outlook Still Good

So much has been said about the beneficial effects of fall introductions of automobiles that it appears desirable to examine facts and figures on that subject. Industrial employment in Detroit on Dec. 15 was 109.9 on the index of the local Board of Commerce, or just a shade lower than at the year's peak last April. Factories are working frantically to supply enough cars to dealers to fill retail sales, and the buying wave shows no signs of subsiding. Parts plants are operating on extra shifts and steel mills, particularly makers of flat-rolled material, are booked to capacity for weeks ahead.

In the passenger car field the stimulation of fall announcements is amply demonstrated by fourth quarter estimates. Production during October, November and December is put at 26.3 per cent of the year's total by the Automobile Manufacturers Association, whereas last year it was only 10.9 per cent and during the six years from 1929 through 1934 was 12 per cent. Domestic registrations of passenger vehicles also are up considerably. Estimated domestic sales for the final quarter, at 575,000 cars, will be about 21 per cent of the year's business. The last quarter a year ago was responsible for 17.1 per cent of the 1934 total; the six-year average was 15.2 per cent.

When one's inquiry is broadened from the final quarter of the year to the last half, substantially different results are revealed. It has been the general impression that passenger car buyers are a finicky lot who want new cars in the spring and scorn them after July. Yet registration figures for recent years tell a different story. In 1934 new car sales in the last six months constituted 47.2 per cent of the year's volume; the average for the past six years is 43.1 per cent. So the fact that 46 per cent of the passenger cars sold in 1935 fell in the July-December period isn't so startling as it might seem at first glance. It is little better than the industry has been doing for years.

On the production side there has been a distinct gain. Forty-two per cent of this year's output is credited to the last half. Last year the per centage was 35.2 and the six-year average is 36.7 per cent.

Moving over from passenger cars to trucks, one finds that the ballyhoo about the influence of fall introductions on production and sales is scarcely justified by the facts. This year 46 per cent of all trucks built have come off assembly lines in the last six months. In 1934 the proportion was 45.4 per cent; the six-year average is 43.1 per cent. Truck sales during the fourth quarter in the United States are estimated at 21 per cent of the year's total. Perhaps it is a surprise to learn that the percentage in the final quarter of 1934 was 23.1 per cent, or more than this year, and the six-year average is 20.4 per cent.

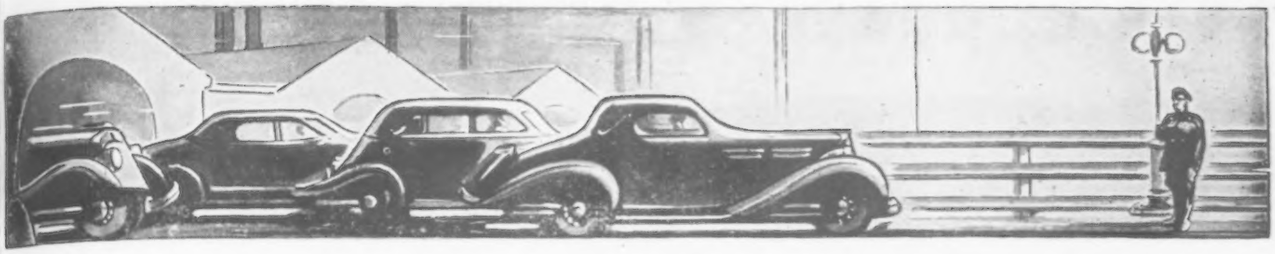
These figures are given partly as proof that the phenomenal run of business which the automobile industry has been enjoying is not solely attributable to fall introductions, although the influence of this factor is fully recognized. Another important factor is the general upturn in purchases of consumer goods. In other words, a considerable portion of the business done this fall would have materialized, regardless of the early showing of new models.

It long has been the ambition of the automobile industry to have its sales distributed evenly over the year. It isn't so far from its goal at present, and high officials are predicting that in 1936 around 50 per cent of passenger car sales will be made in the last six months.

To those who fear what may happen during January and February, one prominent executive says, "I can't understand why anybody should get alarmed. Suppose we do fall off a bit in the next 60 days (although I don't think we will), operations still will be so much better than they usually are at this time of year that no one has a legitimate complaint."

As a matter of fact, the next two months loom as a period of tremendous activity. There has been no discernible relaxation in the public's purchase of new passenger cars, and some companies report deliveries cannot be made on certain models for four weeks. The momentum of current demand alone will carry the industry through January and even if retail sales should dip a bit, stocking of dealers should keep production at a high level during February.

The used car situation still is spoken of in hushed tones around Detroit. It seems to be the only major worry of the industry at the moment. There is at least one company which doesn't appear upset about possibilities of used cars glutting the market. Chevrolet sold over 100,000 used cars in November and final figures are expected to show around 130,000 in December. This has been no happenstance, but



ASSEMBLY LINE

BY BURNHAM FINNEY
Detroit Editor, The Iron Age

can be traced back to the intelligent merchandising and advertising program formulated by W. E. Holler, Chevrolet's general sales manager. Chevrolet is the only company which has been carrying used car advertising in national magazines. Factory-backed advertising in newspapers urges five advantages for used car purchasers —having a dependable car for bad weather, saving cost of reconditioning the present car for winter, getting early choice of models recently turned in, possessing safe tires for winter streets and enjoying present low prices.

Construction of the Grand Rapids Stamping Division of General Motors, to be operated by Fisher Body, will begin next month. It will consist of two major departments, one devoted to production of large stamping dies and tools and the other to fabrication of 2000 complete sets of stampings a day, consisting of panels and other metal parts used in body-building. E. F. Fisher, general manager of Fisher Body, states that the additional die shop capacity is needed immediately and that the expansion in stamping operations is partly due to changes in design tending toward steel construction, of which the all-steel turret top is an excellent example.

Cost of the new division, including equipment, is expected to be $7,000,000. First units should be ready to operate in March, with the entire plant finished next summer in time for 1937 production. About 1800 workers will be employed, adding $2,500,000 a year to payrolls of Grand Rapids. Four mammoth turret top presses already have been ordered for the new plant. Each of these presses will stand more than four and one-half stories in height, weigh from 400 to 500 tons, and exert pressures up to 2250 tons. It is understood that a number of smaller presses are yet to be bought. It is believed that tool room equipment, as well as some special milling machines, bought by Fisher in the last 60 days, is for use at Grand Rapids.

While the growing production of automobiles is creating a need for greater manufacturing facilities, this isn't the full explanation of the Grand Rapids project. A deeper significance is found in a statement by Mr. Fisher that "the equipment to be installed will be such that it can be used for emergency production at any time should break-downs, or other unavoidable delays, interfere with other sources." The "unavoilable delays," of course, refers to strikes. It is reported that the products to be made at Grand Rapids will duplicate those fabricated by Fisher Body's Cleveland plant, where labor difficulties have occurred in the last two years. This means that beginning next fall the Fisher people can practically ignore the Cleveland situation in case agitators incite trouble there.

The Grand Rapids plant will provide one more source of supply within the corporation for body stampings. Its construction is a move comparable to that made by Chevrolet when it expanded operations at Saginaw and Muncie to build transmissions after the Toledo strike last spring. The Cleveland factory of Fisher Body will continue to function, just as Chevrolet's Toledo division still is active.

Pontiac is expected to close the coming week for considerable equipment for the machining and assembly of its rear axles, a part which has been made for some time by the Chevrolet gear and axle plant. It is said that facilities will be provided for 60 axles an hour. Hercules Motors, getting ready to tool up for a six-cylinder Diesel engine, is understood to have bought used machinery for its line.

Rumblings of the approach of 1937 tooling programs are heard. A division of General Motors soon will ask for bids on equipment and already is said to have had preliminary conferences with machinery builders. While its plans are still in the formative stage, it is reported to have been allotted by the General Motors high command a fund of $15,000,000 to prepare for next fall.

Packard has every intention of going ahead with its plans for a lower-price six, according to reliable advices. It will not buy equipment until next month, but is hopeful that tooling and installation of machinery will be completed in time for production to start next May. It originally had set April for initial manufacture. In view of the delays encountered today in securing deliveries of new machinery and of the leisure with which Packard seems to be moving, it appears doubtful whether the proposed car will be introduced before the 1937 model season, which begins Aug. 1.

Car production rose the past week well above 100,000 units for the first time since last spring. Some companies worked on Saturday to make up for the loss of production on Christmas, since their sales departments are pushing them for delivery of cars. Ford is reported building about 5500 cars a day and Chevrolet is over the 5000-a-day mark. Chrysler is holding to its aim of turning out about 100,000 cars a month.

Buick this year has built 107,584 cars, a gain of close to 30,000 units over last year and the first time since 1930 that the company has topped 100,000 units. Buick's output in 1936 is expected to average 14,000 cars a month. In the first 10 days of December Buick sold at retail 3459 cars. Studebaker this month will attain its goal of 8800 cars and trucks, with at least the same number, or perhaps more, to be built during January. It confidently expects to exceed its original schedule for making 80,000 cars in 1936.

Hudson made retail deliveries of over 4000 cars in the first two weeks of December, a total topping the first two weeks of any month this year except April.

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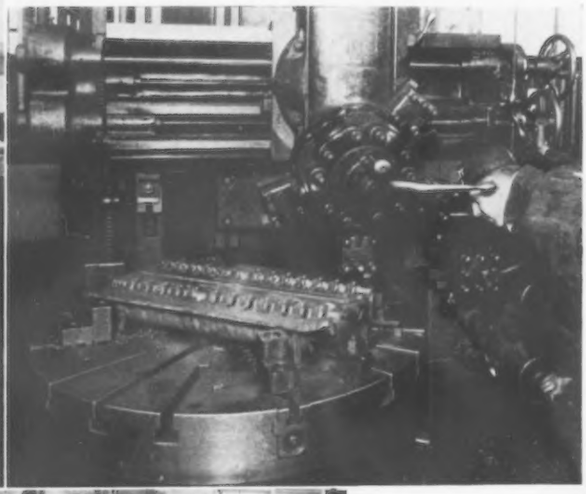

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Convenient—Independent CONTROL of Feeds . . Rapid Traverse, Speeds and Brake

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Bridgeport Connecticut

THIS WEEK IN WASHINGTON

Requiescat in pace for NRA.

o o o

Shift from boondoggling to public works seen in plans for expenditures in 1936.

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Telephone and telegraph companies exempted from coal commission ruling.

o o o

Craft union-industrial union row in A. F. of L. grows hotter.

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Major Berry gives industry another opportunity for salvation.

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By L. W. MOFFETT

Resident Washington Editor, The Iron Age

o o o

WASHINGTON, Dec. 24.—With the National Recovery Administration marked for legal extinction on April 1, unless extended by Congress, members of the staff of the once heavily staffed Division of Review are preparing to make reports on the many industrial studies in which they are engaged. Work on the reports will not be halted by transfer of NRA to other departments.

In a few instances preliminary reports have been drawn up and recommendations made. But major studies, such as those concerning the iron and steel industry, have not reached the point where actual preparation of a report has begun. A. G. White, who succeeded R. W. Shannon, resigned, as deputy section director in charge of the steel study, expects the final report will be submitted about March 15. Field work in connection with the study is nearly completed and most of the material to be gathered has been assembled. It remains to be correlated and interpreted. Covering a broad field, the report will be made up in sections, dealing with such subjects as labor, production, wages, competition and price structures, especially as they relate to the basing point system, etc., prior to, during and after the code.

So far only a comparatively small number of steel companies has replied to a questionnaire sent out in October regarding a long list of practices and problems in the industry. The subjects covered in this questionnaire relate to price discrimination, market demoralization, trade practices, jobbers' regulations, exports and imports, trade associations, interstate commerce, depreciation policy, labor, ore resources, limitations upon use of scrap, raw material, assembly costs, and stock ownership. Mr. White said that a number of the larger companies which as yet have not done so have indicated that they will answer the questionnaire.

While the old Division of Review will suffer a large reduction in its staff as the result of the NRA demolition orders, effective Jan. 1, Mr. White said his staff will see only minor changes. It will have replacements so that it will not be affected to any great degree.

Before coming to Washington, Mr. White was associated with the National Industrial Conference Board in New York. Previously he was professor of economic geography at the Wharton School of Finance, University of Pennsylvania. During the period 1912-1919 he was an economist in the Bureau of Mines in Washington.

Among drafts of NRA reports which are said to have been submitted is one on open price filing. It is said to recommend the practice provided that price changes shall not be made except upon advance notice. . . . Some reports are said to have been filed but to have been withdrawn for revision. . . . The significance is understood to lie in the fact that recommendations for further Government regulation did not meet with approval of the higher-ups . . . which would indicate that Administration officials are leaning toward a further breathing spell and turning from additional Government regimentation . . . at least pending the election campaign . . . though it is certain Congress itself stands ready to go the limit toward any sort of regimentation which a large sec-

tion of its members thinks will be politically expedient.

Shift from the policy of boondoggling employment to employment in durable goods industries is the interpretation made of the announcement by President Roosevelt that less than $500,000,000 will be asked of Congress for specific projects in connection with the works relief program. . . . The money will be used to complete heavy public works projects. . . . Unlike the previous appropriation of $4,880,000,000, the new legislation will definitely set forth specific appropriations, it was stated. . . . It was over the means of distributing works relief appropriations that Harold L. Ickes, public works administrator, and Harry L. Hopkins, Federal emergency relief administrator, engaged in a lively row. . . . Hopkins won in his insistence on quick, cheap projects, consisting chiefly of boondoggling. . . . Ickes held out for heavy projects, both because of the direct and indirect labor, the latter reflected through the iron and steel, metal-working and other durable goods industries. . . . The $900,000,000 which had been earmarked for PWA, Mr. Ickes saw slashed to $330,000,000. . . . Now, however, the Ickes idea appears to have gained dominance, though there is still to be determined exactly what the President means by public works for which the additional funds will be expended together with funds still existing. It has not been made known whether the new appropriation will carry funds for housing. . . . There is also interest manifested over reports that the PWA may be abandoned with completion of projects now under construction and lump sum appropriations for Government housing activities made for administration outside of PWA. . . . The PWA housing program involves about $350,000,000 financed from old public works funds, and enough money is available for completion of this housing program, which is now well under way.

Having made one graceful backdown by which it exempted telephone and telegraph companies from its ruling requiring the use of code coal by contractors rendering service to the Government, the National Bituminous Coal Commission has laid itself open to further relaxation of this hard-and-fast rule . . . unless in the meantime the act is knocked out by the Supreme Court. . . . Evidently the Government faced the incomprehensible prospect of being shut off from telephone and telegraph service or of enforcing its order. . . . The "new interpretation" of the ruling, as Commissioner George Edward Acret put it, followed an inquiry by the American Telephone & Telegraph Co. . . . and it cannot be denied that the "new interpretation" was necessary and it can be safely predicted a similar interpretation will have to be made for other corporations supplying services and materials to the Federal Government . . . and possibly to the point where the ruling will be more conspicuous for its breach than its performance. . . . The telephone and telegraph companies using bituminous coal strictly for building heat, "although rendering service to the Government, do not fall within the category of contractors required to purchase bituminous coal from producers assenting to the code promulgated in accordance with the Bituminous Coal Conservation Act of 1935," it was held. . . . Commissioner Acret said that the distinction is made in this case because the American Telephone & Telegraph Co. uses coal only for the purpose of heating its buildings, which is a purpose merely incidental to the service furnished the Government. . . . He added, said a statement issued by the commission, that the commission considered that any other ruling would have been unreasonable and arbitrary . . . which makes it unanimous. . . . The ruling, it was pointed out, will have the effect of "further clarifying the commission's interpretation of Section 14 of the (Guffey-Snyder) act, with reference to coal purchases by those serving the Federal Government" . . . and even further "clarification" is expected. . . .

The row within the American Federation of Labor over the craft-industrial union issue has become hotter. . . . Raising his voice as the chief spokesman for the powerful craft unions, John P. Frey, president of the metal trades department of the A. F. of L., has hurled at John L. Lewis the charge of attempting to split the trade union movement at a critical time. . . . Mr. Lewis, president of the United Mine Workers of America, is also head of the industrial union committee which is seeking to organize vertical unions in the mass industries. . . . The A. F. of L. policy is

W. J. Filbert Retires From Steel Industry

RETIREMENT of William J. Filbert as chairman of the finance committee of the United States Steel Corpn., as mentioned briefly in THE IRON AGE last week, will end the business career of one of the least publicized but most influential of the elder statesmen of the steel industry. Associated with the elder J. Pierpont Morgan in the formation of the Steel Corporation in 1901, Mr. Filbert served as comptroller from 1902 until 1930 when he became vice-chairman of the finance committee. He has been the chairman of this important committee for the last three years and a member since 1922.

Mr. Filbert has also served as an executive and a director of many of the corporation's subsidiaries and naturally relinquishes all of these positions, as of Jan. 1.

Upon receiving his resignation as a director of the American Iron and Steel Institute, the board elected Mr. Filbert honorary vice-president of that organization. His place on this directorate was filled by B. F. Fairless, president of the Carnegie-Illinois Steel Corpn.

E. R. Stettinius Rises Rapidly in Corporation

Edward R. Stettinius, who succeeds Mr. Filbert as chairman of the finance committee of the United States Steel Corpn., becomes the youngest first line executive in a major steel company. Now only 35 years of age, his rise in the business world has been extremely rapid. A graduate of the University of Virginia in 1924, he began his career with the Hyatt Roller Bearing Division of the General Motors Corpn. and in 1926 was made assistant to the vice-president in charge of the corporation's accessories division. In 1930, he became assistant to Alfred P. Sloan, president of General Motors, and the following year he succeeded to a vice-presidency. Mr. Stettinius joined the Steel Corporation in April, 1934, as vice-chairman of the finance committee, after having served briefly in Washington as a member of the National Recovery Administration and as executive secretary of the Industrial Advisory Board of the Department of Commerce.

W. J. FILBERT, Drawn by John Frew for The Iron Age.

committed to continuance of craft unionism, and President William Green of the A. F. of L. has had several sharp clashes with Mr. Lewis over the latter's movement to organize industrial unions. . . . Mr. Green has said he is opposed to the move of the industrial union committee because any organization within an organization is dangerous, though frankly admitting his personal sympathy for industrial unionism. . . . Mr. Frey's personal and official sympathies lie with craft unionism and, though the row over the issue has just got well under way, the betting is in favor of the craft unionists. . . . They have held sway since the A. F. of L. was organized and it is certain they will put up a decidedly stiff and a probably successful fight against surrendering their jurisdiction. . . . In his letter to all metal trades councils of the A. F. of L., in which he accuses Mr. Lewis of seeking to develop a rift within organized labor, Mr. Frey told the councils that the efforts of the committee for industrial organization will fail. . . . He urged the councils to resist propaganda from the group headed by Mr. Lewis. . . . The efforts of the industrial committee said Mr. Frey, "are welcomed by employees opposed to the existence of trade union organizations" . . . and, he said, they are "giving encouragement and satisfaction to the Communist party." Thus the opposing sides have opened the battle by use of high-powered publicity . . . and each faces a formidable foe.

Whatever may be otherwise said of the much-pestered Communist party as to its low depth in social, political and economic standing, it appears to have a nuisance value at least . . . as is emphasized by Mr. Frey's reference to it. . . . It provides a convenient vehicle as a term of obloquy, ready to be drawn forth, as it is so frequently, when it is desired to cast odium on an adversary. . . . Only recently Major George L. Berry, bitter because industrialists in such major fields as steel, automobiles, lumber and cotton textiles, refused to attend his fizzled conference, likened them to Communists. . . . One imagines he had to resort to onion fumes or some other means to produce synthetic tears in order to do so, but in any event the tenacious major even wept for these industrialists and declared their non-appearance was pathetic . . . not for the major, of course . . . rather the major was deeply hurt that these industrialists were so obfuscated as to be unable to see the blessings his conference held forth in the way of stimulating recovery. . . . Nevertheless, the persistent major hopes or affects to hope that these industrialists will see the light and be redeemed. . . . For the major is valiantly trying to set up an Industrial Council of Progress of his own, to be built around the small nucleus that peeped forth from his first personally conducted peace meeting that broke up in a row when all but a few minor groups walked out on him. . . . To this end the major has announced that his so-called Industrial Council will meet in Washington on Jan. 6 and that he will welcome gladly those groups which declined to participate in the first conference. . . . These groups, once likened to Communists, thus are offered an opportunity for salvation. . . . Clearly with White House approval, Major Berry announced the date of the next effort at "coordination and industrial cooperation" after conferring with the President. . . . He said that the steel, automobile, textile and lumber groups were still holding out, but "we would be glad to have their ideas." . . . It was the general impression that the major had had the ideas of some of these groups and that it almost required asbestos paper to convey their ideas . . . convictions would have been a better term.

The major perhaps realizes, in view of the cold dash given his first effort, that he is engaged in a futile task . . . but he is known for both his tenacity and optimism . . . and it can be said freely for him that as an organized labor official he has proved a most capable negotiator with employers . . . that may be due in part to the fact that the major is himself an employer with a fine printing plant in Tennessee and with some fine accounts.

The major's activities, so the White House has said, fit in perfectly with the arrangement to draw the curtain on NRA and to distribute its remnants among other departments . . . thus even the identity of a once pompous Blue Eagle organization comes to an end. . . . The major, however, did not get the White House O. K. for his ambitious plan to have the "skeletonized" NRA continued after Jan. 1 under the direction of a committee, the major to be head of the committee. . . . Organized labor was keen for the plan, too . . . instead, Secretary Roper won the toss and got part of the skeleton. . . . This looks like a play to business, a sort of a hypodermic of oxygen to aid further the respiration spell for business. . . . In any case, Mr. Roper's Business Advisory Council had recommended transfer of the NRA remnant to the Department of Commerce. . . . But the announced plan is that the entire NRA will be a mere memory and nothing more after April 1. The Administration thus abandons officially its previous recommendation for legislation at the next session to revive NRA. . . . Farewell, if not adieu!

Like other New Deal legislation that is being attacked from many sides as to its constitutionality, the Guffey-Snyder coal act was given further judicial thumping the past week and coincidentally moved closer to a decision by the United States Supreme Court. . . . The outstanding move in this direction was taken when over-worked Solicitor General Stanley Reed agreed to a request filed earlier for a decision in the Carter Coal Co. case without awaiting action of intermediate courts. . . . Nineteen operators in the Harlan County, Ky., field asked the Supreme Court to reverse a decision by the Western Kentucky Federal District court which upheld the constitutionality of the act. . . . In a Federal court in Pittsburgh it was held unconstitutional. . . . In other courts it likewise has been held unconstitutional . . . and the one decision eagerly awaited, because it will be final, is that of the Supreme Court. . . . If it knocks out the law, it will be pleasing to industry and displeasing to organized labor. . . . If it approves the law, industry is in for a lot of proposed "little NRA's." . . . Senator Guffey, chief legislative sponsor of the Guffey-Snyder act, has already said that, if the Supreme Court upholds the law, he will ask for a similar law for the anthracite coal industry. . . . That will be the beginning only.

▼ ▼ ▼

Department of Commerce Sets Up Construction Unit

The establishment of a new unit in the Bureau of Foreign and Domestic Commerce, Department of Commerce, for research in the business problems of the construction industry and related aspects of urban real property has been announced by Secretary Roper, in response to recommendations of the industry and the Business Advisory Council. The studies in this field which are felt to be particularly the responsibility of the Department of Commerce are those relating to private construction in contrast with public works which fall within the scope of other Departments of the Government, it was stated. One of the studies which the newly established unit has undertaken is that of investigating the fluctuations in the demand for industrial and commercial building in relation to other economic factors, such as the development of new industries, the volume of manufacturing production, industrial earnings, interest rates and other factors.

Iron and Steel Duties Unchanged In Dutch Trade Agreement

WASHINGTON, Dec. 23.—The United States-Netherlands reciprocal tariff agreement, made public today by the State Department, carries no changes in either import or export duties on iron and steel and metal-working machinery items. While the Netherlands granted no reductions whatsoever in duties on any product in the entire agreement, that country agreed to bind duties at their present rates on some metal equipment lines and also increased quota allotments on shipments from the United States. Concessions in duties granted by the United States relate chiefly to such items as seeds, flowers, oils and chemicals.

The general provisions contain the usual ones for unconditional most-favored-nation treatment. The agreement will become effective Feb. 1, 1936, to remain in force until Jan. 1, 1939, unless previously terminated upon six months' notice. The agreement remains to be proclaimed by the President and ratified by the Queen of the Netherlands. The differences in provisions of this agreement as compared with previous agreements are rather marked as to technical detail. They relate principally to concessions exchanged between the United States and the Netherlands and Netherland Indies.

Among concessions granted by the Netherlands was the binding of duties at prevailing rates, as indicated, on the following: Large refrigerators and cooling units, 6 per cent; copy presses, etc., 10 per cent if weighing 150 kilos or less; 6 per cent if weighing over 150 kilos; typewriters and parts, calculating machines and adding machines and parts, bookkeeping machines and parts, 10 per cent; passenger automobiles, commercial automobiles, internal combustion engines for automobiles and tractors, tractors, chassis and chassis frames for automobiles and tractors, other underframes for tractors, 15 per cent.

Netherland Indian duties were bound as follows:

Internal combustion and explosion motors and parts: For automobiles of all kinds, 30 per cent; for rail traction, free; for boats and airplanes, 18 per cent; small refrigerators and cooling units, 30 per cent; typewriters and parts, calculating and adding machines and parts, 18 per cent; passenger automobiles, 30 per cent; motor trucks and buses, 18 per cent; chassis and parts for trucks and buses, 18 per cent; for passenger automobiles, 30 per cent; automobile accessories, 30 per cent.

Tariff exemption also was granted by the Netherlands, on copper in pigs, ingots and bars.

Minimum quota allotments granted by the Netherlands, on an annual basis, included wire nails and tacks, 738 metric tons; drawn wire, iron and steel, 2762 tons; locks and parts, 1000 kilos, and sheet zinc, 69,000 kilos.

Among concessions granted by the United States was the binding on the free list of ammonium sulphate.

Because of peculiar and complicated restrictive measures, specific concessions obtained by the United States are divided into three different schedules. The first of these schedules covers concessions in rates on import duties, monopoly fees and "crisis" provisions. Another includes a purchase agreement whereby the Netherlands commits itself to the purchase of a minimum quantity of American wheat or wheat flour. The third covers annual quota allotments.

Provision is also made that in the event of wide variation in the rate of exchange between the two countries either can, if it considers the variation so substantial as to prejudice its industries or commerce, negotiate for modification of the agreement. If agreement is not reached within 30 days, the agreement can be terminated on 30 days' notice.

New York Central to Buy Rails

WASHINGTON, Dec. 23.—Application has been filed with the Interstate Commerce Commission by the New York Central Railroad under the National Industrial Recovery Act for approval of railroad maintenance and equipment in connection with the purchase of 35,000 tons of steel rails and accessories. Application was made previously by the railroad to the PWA for loans in the amount of not exceeding $2,092,500. In addition to the rails other requirements include 1,157,200 tie plates. The rails are to be laid in New York, New Jersey, Massachusetts, Ohio, Indiana, Michigan and Illinois.

Cast Iron Pipe Rates Reduced

WASHINGTON, Dec. 23.—Reduction has been ordered by the Interstate Commerce Commission in railroad rates on cast iron pipe in carloads from the Birmingham district in Alabama and from Chattanooga, Tenn., to destinations in the western part of Western Trunk Line territory. The commission held that rates equal to 120 per cent of those in the Eastern scale will be reasonable. At present the rates run as high as 157 per cent of that scale.

New rates were fixed in a mileage scale. They range from $8.40 per net ton for 500 miles up to $17 a ton for 1700 miles.

Broadly, the destinations include the greater part of Minnesota, Nebraska and Kansas, the southwestern corner of Missouri and all of Colorado and Wyoming in Western Trunk Line territory.

Complaint against the rates was made on behalf of cast iron pipe companies in the Birmingham district and Chattanooga by the Alabama Iron and Steel Shippers' Conference.

Richard Thomas Is Licensed By Armco

RICHARD THOMAS & CO., Ltd., of England, has been granted a license by the American Rolling Mill Co., Middletown, Ohio, to use its Tytus continuous sheet rolling patents and cross rolling patents.

Richard Thomas & Co., Ltd., is the largest manufacturer of tin plate in England. The company is ordering machinery for a complete hot and cold continuous mill unit from U. S. manufacturers. The new mill, which will probably be constructed at Ebbw-Vale, Wales, is estimated to cost £1,000,000.

Armco recently licensed Vereinigte Stahlwerke, Germany, to use its continuous sheet rolling and cross rolling patents.

NEWS OF THE WEEK

Crucible Acquires National Drawn Mill

PITTSBURGH CRUCIBLE STEEL CO., Pittsburgh, has acquired the former mill of National Drawn Steel Co., near East Liverpool, Ohio, and will occupy the new branch plant for steel converting service, including annealing, surface grinding, straightening, etc. Improvements will be made in different divisions with increased facilities. The newly acquired plant was sold under foreclosure proceedings a few years ago to East Liverpool interests, and since has been operated occasionally for a Pittsburgh company.

Granite City Buys Mill Equipment

THE Granite City Steel Co., Granite City, Ill., has awarded to Allis-Chalmers Manufacturing Co., Milwaukee, contract covering the main drives and heavier electrical equipment for installation in new hot and cold strip mills. Additional electrical equipment which will be required, will be awarded to electrical manufacturing companies, including Westinghouse Electric & Mfg. Co., Century Electric Co., Wagner Electric Corp. and Maloney Electric Co.

Other contracts awarded by Granite City company include foundations to Fruin-Colnan Contracting Co.; cranes to Harnischfeger Corp.; buildings to Stupp Brothers Bridge & Iron Works, and, as previously announced, mill machinery to United Engineering & Foundry Co.

Work on the new equipment program is progressing satisfactorily and it is expected that the new units will be in operation the early part of the summer. The installation of this new equipment will not interfere in any way with the Granite City company's ability to take care of its customers' requirements for all regular products.

Brent Wiley to Head Engineers Association

BRENT WILEY has been elected managing director of the Association of Iron and Steel Electrical Engineers. This will be effective Jan. 1.

A graduate of Rose Polytechnic Institute in 1898 with a B.S. degree in electrical engineering, and later having been awarded an M.S. degree, Mr. Wiley has been closely associated with the steel industry for the past 37 years.

After leaving college, he spent one year in the electrical department, Ohio works, Carnegie-Illinois Steel Corpn., later going to the Homestead works of the same company as the assistant to the electrical superintendent.

Leaving the Carnegie-Illinois Steel Corpn. in 1904, Mr. Wiley went with the Wellman-Seaver-Morgan Co., Cleveland, as electrical engineer. In 1906 he left this company and became associated with the Westinghouse Electric & Mfg. Co., with whom he spent the next 25 years. While affiliated with this company, his duties were largely confined to the subject of the development of electrification of the steel industry, which work required a great deal of investigation and engineering work.

BRENT WILEY

Scrap Institute to Meet at Chicago

PLANS for the eighth annual convention of the Institute of Scrap Iron and Steel indicate the largest attendance at any convention since the organization of the Institute in 1928. The committee in charge of the convention, which will be held at the Sherman Hotel, Chicago, Jan. 21, 22 and 23, is headed by Walter Erman, Erman-Howell & Co., Inc., Chicago; Max Schlossberg, M. S. Kaplan Co., Chicago; and Walter Newman, Hyman-Michaels Co., Chicago, as co-chairmen.

The first day of the convention will be devoted to various committee and board meetings. An intensive study of scrap costs and competitive conditions which reduce scrap profits, will feature the open-forum discussions of the second day. Under the general heading of "How to Reduce Scrap Costs and Make a Profit," selected speakers will discuss the costs of handling and preparing a ton of various types of scrap, the

payroll taxes imposed by the social security laws, and compensation insurance costs, which have become an increasingly heavy burden on scrap dealers. Other factors of costs, which will be discussed at this session, will make the meeting of highly educational value to the members who attend.

On the third day it is planned to hold an open-forum on "A Review of Conditions in the Various Scrap Markets of the United States"; with selected speakers from each district. A comparison of the changes which have occurred in the scrap industry in the last thirty years in the different markets, will result, it is hoped, in an understanding of a common basis of action for the improvement of scrap conditions throughout the country.

Mesta Machine Pays Christmas Bonus

THE Mesta Machine Co., Pittsburgh, completing the most active year in its history, voted to pay a Christmas bonus to all salaried employees. Those who have been with the company nine months or longer received a payment of two months' salary, while those who had been with the company since April 1 of this year received bonuses proportionate to their length of service. The payments averaged over $500 each for about 225 employees.

Skilled employees receiving an hourly wage have been working on a bonus system and had already received extra payment in addition to overtime compensation.

Total employees at the Mesta plant, which manufactures rolling mills and other equipment for the steel industry, reached 2970 on Dec. 17, the largest number ever employed for manufacturing operations. This figure compares with 1880 employees at the beginning of this year, with 1095 on Jan. 1, 1934, and 897 on Jan. 1, 1933.

Detroit Scrap Market Is Quiet

DETROIT, Dec. 23.—The holiday lull has settled over the local scrap market, which is expected to be relatively quiet until early in January. Prices are firm and unchanged.

PERSONALS

RICHARD O. BINKOWSKI has returned to the executive staff of the Harnischfeger Corpn., Milwaukee, to take charge of the newly-established division manufacturing prefabricated steel homes. THOR HANSEN has been appointed production manager, and A. M. LOCKE, sales manager of the division.

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W. ELZEY BROWN, sales promotion manager, tractor division, Allis-Chalmers Mfg. Co., Milwaukee, has resigned to make new connections to be announced Jan. 1. Before joining the Milwaukee concern, he was associated with the Muskogee Iron Works, Muskogee, Okla.

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HORTON PENROSE has been appointed Cleveland district sales manager of the U. S. Fuel & Iron Co., Pittsburgh, which has opened an office at 225 Rockefeller Building in that city and will have the Cleveland district sales agency of the Sloss-Sheffield Steel & Iron Co., Birmingham. Mr. Penrose was formerly engaged in pig iron sales in the Pittsburgh district and later was connected with the pig iron sales department of the Cleveland Cliffs Iron Co., Cleveland. Recently he has been head of the Penrose Coal Co., Cleveland.

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RAY S. FOX, formerly manager of the pig iron sales department of the Cleveland Cliffs Iron Co., Cleveland, and more recently head of R. S. Fox & Co., Cleveland pig iron brokers, has become affiliated with the pig iron sales department of the Republic Steel Corpn. with headquarters in Cleveland.

J. P. McCASLIN, who, as announced in these columns two weeks ago, has been made superintendent of bar mills of the Duquesne, Pa., works, Carnegie-Illinois Steel Corpn.

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RALPH LEAVENWORTH, for several years general advertising manager of Westinghouse Electric & Mfg. Co., East Pittsburgh, has resigned, effective Dec. 31. On Jan. 1 he will join Fuller & Smith & Ross, Inc., Cleveland advertising agency as account executive, devoting special attention to building construction and general industrial accounts. Previous to his association with the Westinghouse company, Mr. Leavenworth was associated with the sales organization of the Austin Co., Cleveland, and with Paul Teas, Inc., Cleveland advertising agendy.

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RAY MACK, heretofore identified with the main office of the Carboloy Co., Inc., Detroit, will be transferred, effective Jan. 1, to the Chicago district office as an addition to the sales personnel covering Northern Indiana and Illinois. J. C. KENT, also of the Detroit office, will be added to the sales personnel covering Southern Michigan, and J. E. WELDY, Minnesota representative, will be made assistant to the Detroit district sales manager.

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C. BRUCE GARDNER, chairman of W. G. Armstrong Whitworth & Co., Ltd., has accepted the chairmanship of the London Iron & Steel Exchange succeeding LORD GREENWOOD.

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DR. EDWARD R. WEIDLEIN, director, Mellon Institute of Industrial Research, Pittsburgh, has been elected president of the American Chemical Society for 1937.

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J. M. HIGHDUCHECK, formerly supervisor of cutting tools and applications, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed district manager for the midwestern territory by the American Cutting Alloys, Inc., New York, manufacturer of Cutanit.

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CHARLES L. HYLAND has been made sales representative in the Springfield, Ohio, Dayton and Cincinnati territory for the cold drawn bar steel division of the Western Automatic Machine Screw Co., Elyria, Ohio. He will make his headquarters at 11 West Monument Avenue, Dayton.

Final Spurt in Capital Goods Activity Sets New Record

WITH the approach of the holiday season, activity in capital goods, as measured by THE IRON AGE index, has climbed higher, but during the remainder of the year recessive tendencies can definitely be looked for. The final spurt displayed by industry last week was sufficient to raise the index above all previous levels for the year to an estimated 83 per cent of the base period average. While not all factors contributed to this unusual gain, heavy construction awards of almost $87,000,000 were larger than for any other week this year, and exceeded the previous record by approximately $27,000,000.

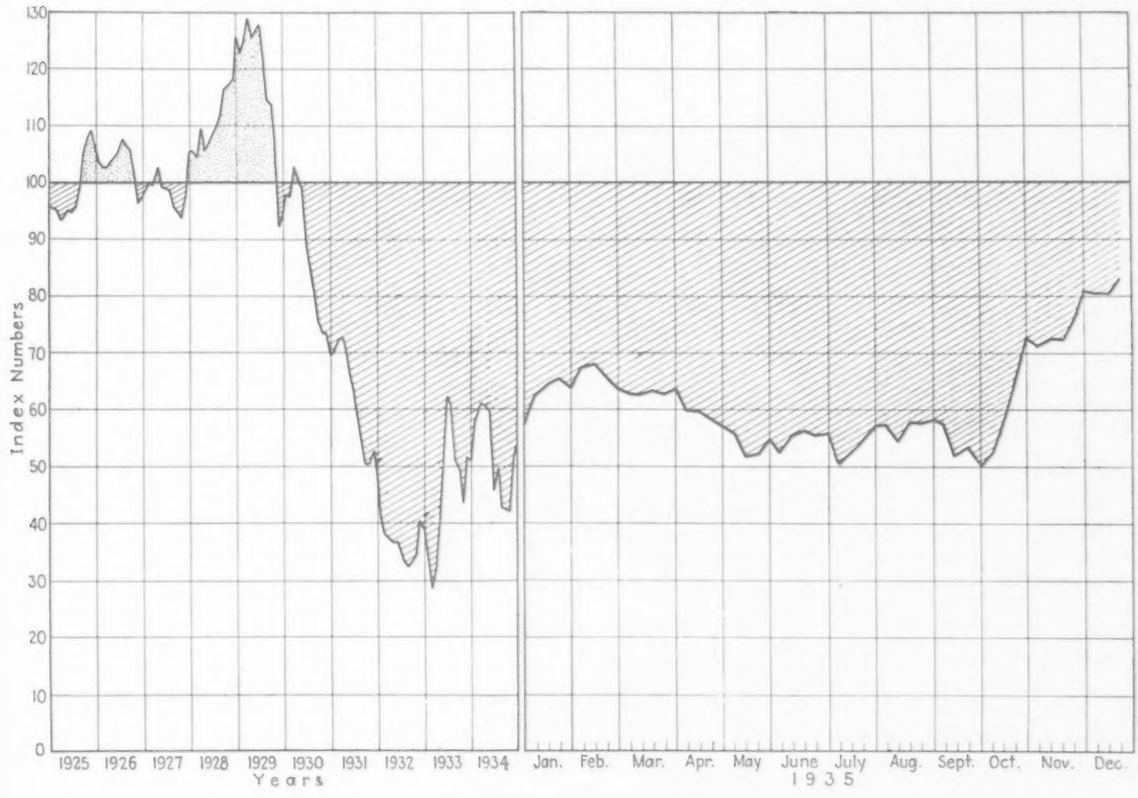
Production of automobiles, by passing the 100,000 mark, rose more than seasonally last week. Steel ingot rates declined, but much less than seasonal expectations called for. As a result, the steel index gave additional support. A slight tapering off of activity in the Pittsburgh sector became evident two weeks ago, and consequently THE IRON AGE'S estimate of that index for last week has been lowered. Lumber shipments have revealed roughly the same tendencies, though in heavier volume.

The current showing for the combined index of 83.0 is 48 per cent greater than last year's comparable figure, 55 per cent above the 1933 figure, and only a little more than 10 per cent below where the index stood at this time in 1929.

The Iron Age Weekly Index Numbers of Capital Goods Activity

(1925-27 = 100)

Last week (est.)	83.0
Preceding week (rev.)	80.2
Same week last month	72.2
Same week 1934	56.0
Same week 1933	53.5
Same week 1932	41.6
Same week 1931	52.9
Same week 1930	73.7
Same week 1929	92.2



(1925-27 Average = 100)

The Iron Age Index of Capital Goods Activity. The years 1925 to 1934 are plotted by months, the current year by weeks.

Components of the index: Steel ingot production rate, from THE IRON AGE; revenue freight carloadings of forest products, from Association of American Railroads; automobile production from Cram's Automotive Reports; heavy construction contract awards, from *Engineering News Record;* index of productive activity in Pittsburgh district, from Bureau of Business Research of University of Pittsburgh.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	November, 1935	October, 1935	November, 1934	Eleven Months, 1934	Eleven Months, 1935
Raw Materials:					
Lake ore consumption (gross tons)[a]	3,020,315	2,910,863	1,298,404	20,608,200	27,755,564
Coke production (net tons)[b]	.....	3,136,351	2,358,300	26,931,000	.....
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,065,913	1,978,411	957,000	14,883,626	18,901,349
Pig iron output—daily (gross tons)[c]	68,864	63,820	31,898	44,583	56,591
Castings:					
Malleable castings—production (net tons)[d]	.....	43,467	28,515	336,712	.....
Malleable castings—orders (net tons)[d]	.....	45,246	28,530	317,641	.....
Steel castings—production (net tons)[d]	.....	.....	25,799	426,171	.....
Steel castings—orders (net tons)[d]	.....	.....	21,552	406,819	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[c]	3,153,247	3,146,446	1,610,325	23,634,861	30,343,769
Steel ingot production—daily (gross tons)[c]	121,279	115,414	61,947	82,639	106,097
Steel ingot production—per cent of capacity[c]	54.78	52.13	28.13	37.3	47.9
Employment in Steel Industry:					
Total employees[c]	.....	436,554	381,663	411,440	.....
Total payrolls (thousands of dollars)[c]	.....	$51,456	$32,937	$422,480	.....
Average hours worked per week[c]	.....	36.8	26.3	30.7	.....
Finished Steel:					
Trackwork shipments (net tons)[c]	3,090	3,495	2,065	46,838	39,204
Sheet steel sales (net tons)[f]	289,101	226,209	133,344	1,637,552	2,270,171
Sheet steel production (net tons)[f]	224,541	222,963	143,057	1,735,720	2,216,216
Fabricated shape orders (net tons)[g]	.....	100,841	89,340	986,583	.....
Fabricated shape shipments (net tons)[g]	.....	91,901	110,560	1,027,535	.....
Fabricated plate orders (net tons)[d]	.....	30,530	16,629	215,967	.....
Reinforcing bar awards (net tons)[e]	11,475	31,865	7,185	169,690	289,315
U. S. Steel Corpn. shipments (tons)[h]	681,820	686,741	366,119	5,539,847	6,709,784
Ohio River steel shipments (net tons)[i]	88,338	104,659	51,710	586,310	864,508
Fabricated Products:					
Automobile production, U. S. and Canada[k]	406,486	283,334	85,179	2,713,645	3,756,276
Construction contracts, 37 Eastern States[l]	$188,115,000	$200,595,700	$111,691,500	$1,450,423,500	$1,580,408,400
Steel barrel shipments (number)[d]	.....	884,688	466,933	6,258,167	.....
Steel furniture shipments (dollars)[d]	.....	$1,562,303	$1,038,951	$10,717,672	.....
Steel boiler orders (sq. ft.)[d]	.....	784,341	286,622	4,108,688	.....
Locomotive orders (number)[m]	0	0	69	163	28
Freight car orders (number)[m]	25	810	4	23,079	8,128
Machine tool index[n]	98.6	102.9	52.4	†44.2	†93.8
Foundry equipment index[o]	100.4	140.0	80.4	†60.7	†122.9
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	59,569	35,272	297,053	.....
Imports of pig iron (gross tons)[p]	.....	17,168	6,055	111,828	.....
Imports of all rolled steel (gross tons)[p]	.....	24,444	10,600	105,806	.....
Total iron and steel exports (gross tons)[p]	.....	238,358	299,263	2,550,109	.....
Exports of all rolled steel (gross tons)[p]	.....	81,248	78,797	870,676	.....
Exports of finished steel (gross tons)[p]	.....	63,954	60,402	755,422	.....
Exports of scrap (gross tons)[p]	.....	145,850	216,566	1,639,193	.....
British Production:					
British pig iron production (gross tons)[r]	525,100	544,300	507,600	5,465,000	5,862,700
British steel ingot production (gross tons)[r]	903,300	907,300	766,000	8,205,200	9,030,900
Non-Ferrous Metals:					
Lead production (net tons)[s]	39,957	42,618	34,809	375,081	378,699
Lead shipments (net tons)[s]	43,023	42,271	31,762	345,127	390,728
Zinc production (net tons)[t]	37,694	36,701	34,977	330,852	391,447
Zinc shipments (net tons)[t]	47,871	47,063	29,928	322,735	423,675
Deliveries of tin (gross tons)[v]	4,035	5,355	4,845	41,685	53,750

†Three Months' Average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corpn.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of the Census; [l] F. W. Dodge Corpn.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Holiday Influences Depress Steel Production to 48½ Per Cent

Sharp Rebound in Operations Is Forecast for January—Rising Demand Revives Talk of Advances in Finished Steel—Scrap Prices Are Unchanged

HOLIDAY influences, manifested in a suspension of steel production on Christmas day and, in the case of some plants, for the remainder of the week, have depressed the national ingot rate to 48½ per cent, or seven points below the rate of a week ago. Operations are down eight points to 35 per cent at Pittsburgh, seven and one-half points to 53½ per cent at Chicago, six points to 56 per cent in the Youngstown district, five points to 33 per cent in eastern Pennsylvania, 25 points to 57 per cent at Cleveland and 10 points to 68 per cent in the Wheeling district.

Mill operations also have been sharply curtailed, tin plate output having fallen to 40 per cent, or one-half the rate of a week ago, and sheet production having dropped to 45 per cent from 75 per cent.

With the underlying general trend of business still upward, quick recoveries of both ingot production and finished steel output are expected in the first week of the new year. Despite consumer shutdowns for inventories, the flow of materials from producers' plants has declined less than is usually the case at the close of the year.

Shipments to the motor car industry have shown almost no recession. Moreover, deliveries of products on which price advances become effective Jan. 1 have increased rather than declined. Pig iron shipments in December will exceed those of November, the previous banner month this year. The movement of semi-finished steel is so heavy that mills find it physically impossible to complete shipments this month and will extend deliveries into January. Similarly, the movement of track spikes and bolts has been stimulated and, to a lesser extent, shipments of cold-finished bars have been accelerated.

BUT in most finished steel products buyers have well deflated inventories and will resume buying in volume after the first of the year. In many cases their purchases will represent expanding consumption. Tractor plants are now operating at full capacity, and farm implement manufacturers will start 1936 with schedules calling for a 25 per cent increase over 1935 output. Growing railroad demand is reflected in an award of 10,000 tons of rails by the Wabash and the filing of an application with the Interstate Commerce Commission by the New York Central for authority to purchase 35,000 tons of rails and track accessories.

Demand may receive added impetus if reported impending price advances on sheets, strip steel, wire goods and possibly other finished products are announced during the first quarter. Such a move was contemplated in November and was postponed, notwithstanding advances in raw material costs. The second effort to lift the market on finished products may be more successful than the first, in view of the further growth of business volume, though the present status of prices is not entirely propitious.

The recent bulge in public works projects has resulted in increasing irregularity in the prices of reinforcing bars, as well as of sheet steel piling. Tonnage purchases in the Detroit district have brought out repeated concessions of $3 a ton on cold-rolled and hot-rolled annealed sheets. In the case of semi-finished steel prices which, in contrast with finished steel prices, were advanced, consumer resistance to the increases is so marked that there is doubt whether the new prices will hold. However, anticipatory buying has been so heavy that deliveries at former prices will extend into next year, and the real test of the market may be postponed until well toward the end of the first quarter.

SCRAP prices, which are always watched because of their reputed barometric significance, are holding steady in all markets, and THE IRON AGE composite for heavy melting steel is unchanged at $13.33 a gross ton.

Structural steel awards of 17,555 tons compare with 24,400 tons in the previous week. New projects total 13,480 tons as against 17,150 tons a week ago. A large accumulation of Government-financed construction work, a considerable part of it made up of small individual projects, is due to be awarded within the next month or two. Outstanding among large undertakings is a 16½-mile section of the Colorado River aqueduct, calling for 44,000 tons of plates and reinforcing bars, on which bids will be opened Jan. 7.

The Miami, Fla., city council has recommended the division of 3600 tons of sheet steel piling for water front improvements among the Jones & Laughlin, Carnegie-Illinois, Kalman, and Inland steel companies. Ferromanganese will be reduced $10 a ton to $75, seaboard, effective Jan. 1. Gravel fluorspar for barge delivery has been advanced 50c. a ton to $17.50, mines. THE IRON AGE composite prices for pig iron and finished steel are unchanged at $18.84 a gross ton and 2.130c. a lb. respectively. Item extras on sheets have been revised, effective at once.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Dec. 23, 1935	Dec. 17, 1935	Nov. 26, 1935	Dec. 24, 1934
No. 2 fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$20.26
No. 2, Valley furnace	19.50	19.50	19.50	18.50
No. 2 Southern, Cin'ti	20.2007	20.2007	20.2007	19.13
No. 2, Birmingham†	15.50	15.50	15.50	14.50
No. 2 foundry, Chicago*	19.50	19.50	19.50	18.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	19.76
Basic, Valley furnace	19.00	19.00	19.00	18.00
Malleable, Chicago*	19.50	19.50	19.50	18.50
Malleable, Valley	19.50	19.50	19.50	18.50
L. S. charcoal, Chicago	25.2528	25.2528	25.2528	24.04
Ferromanganese, seab'd carlots	85.00	85.00	85.00	85.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	29.00	29.00	29.00	27.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	28.00
Slabs, Pittsburgh	29.00	29.00	29.00	27.00
Forging billets, Pittsburgh	35.00	35.00	35.00	32.00
Wire rods, Pittsburgh	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.70

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.85	1.85	1.85	1.80
Bars, Chicago	1.90	1.90	1.90	1.85
Bars, Cleveland	1.90	1.90	1.90	1.85
Bars, New York	2.20	2.20	2.20	2.13
Plates, Pittsburgh	1.80	1.80	1.80	1.80
Plates, Chicago	1.85	1.85	1.85	1.85
Plates, New York	2.09	2.09	2.09	2.08
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.80
Structural shapes, Chicago	1.85	1.85	1.85	1.85
Structural shapes, New York	2.06¼	2.06¼	2.06¼	2.05¼
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	2.10
Hot-rolled strips, Pittsburgh	1.85	1.85	1.85	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60

Finished Steel

Per Lb.:	Dec. 23, 1935 Cents	Dec. 17, 1935 Cents	Nov. 26, 1935 Cents	Dec. 24, 1934 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.40	2.40	2.40	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.50	2.50	2.50	2.50
Sheets, galv., No. 24, P'gh	3.10	3.10	3.10	3.10
Sheets, galv., No. 24, Gary	3.20	3.20	3.20	3.20
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.85
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.95
Wire nails, Pittsburgh	2.40	2.40	2.40	2.60
Wire nails, Chicago dist. mill	2.45	2.45	2.45	2.65
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Plain wire, Chicago dist. mill	2.35	2.35	2.35	2.35
Barbed wire, galv., P'gh	2.80	2.80	2.80	3.00
Barbed wire, galv., Chicago dist. mill	2.85	2.85	2.85	3.05
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.25	$14.25	$13.75	$13.25
Heavy melting steel, Phila.	12.50	12.50	12.50	10.75
Heavy melting steel, Ch'go	13.25	13.25	13.50	10.75
Carwheels, Chicago	13.25	13.25	13.25	11.50
Carwheels, Philadelphia	13.00	13.00	12.75	10.75
No. 1 cast, Pittsburgh	14.25	14.25	14.25	12.75
No. 1 cast, Philadelphia	13.00	13.00	12.75	11.00
No. 1 cast, Ch'go (net ton)	11.75	11.75	11.75	10.00
No. 1 RR. wrot., Phila.	12.25	12.25	12.25	11.25
No. 1 RR. wrot., Ch'go (net)	11.00	11.00	11.00	9.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.50	$3.50	$3.60	$3.85
Foundry coke, prompt	4.00	4.00	4.25	4.60

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	9.00	9.00	9.00	8.75
Lake copper, New York	9.37½	9.37½	9.37½	9.12½
Tin (Straits), New York	48.62½	49.87½	51.25	50.90
Zinc, East St. Louis	4.85	4.85	4.85	3.72½
Zinc, New York	5.22½	5.22½	5.22½	4.07½
Lead, St. Louis	4.35	4.35	4.35	3.55
Lead, New York	4.50	4.50	4.50	3.70
Antimony (Asiatic), N. Y.	14.50	14.50	14.75	13.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 23, 1935	2.130c. a Lb.	$18.84 a Gross Ton	$13.33 a Gross Ton
One week ago	2.130c.	18.84	13.33
One month ago	2.130c.	18.84	13.25
One year ago	2.124c.	17.90	11.58
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1935	2.130c., Oct. 1;	2.124c., Jan. 8	$18.84, Nov. 5;	$17.83, May 14	$13.42, Dec. 10;	$10.33, April 23
1934	2.199c., April 24;	2.008c., Jan. 2	17.90, May 1;	16.90, Jan. 27	13.00, Mar. 13;	9.50, Sept. 25
1933	2.015c., Oct. 3;	1.867c., April 18	16.90, Dec. 5;	13.56, Jan. 3	12.25, Aug. 8;	6.75, Jan. 3
1932	1.977c., Oct. 4;	1.926c., Feb. 2	14.81, Jan. 5;	13.56, Dec. 6	8.50, Jan. 12;	6.43, July 5
1931	2.037c., Jan. 13;	1.945c., Dec. 29	15.90, Jan. 6;	14.79, Dec. 15	11.33, Jan. 6;	8.50, Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9	18.21, Jan. 7;	15.90, Dec. 16	15.00, Feb. 18;	11.25, Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29	18.71, May 14;	18.21, Dec. 17	17.58, Jan. 29;	14.08, Dec. 3
1928	2.286c., Dec. 11;	2.217c., July 17	18.59, Nov. 27;	17.04, July 24	16.50, Dec. 31;	13.08, July 2
1927	2.402c., Jan. 4;	2.212c., Nov. 1	19.71, Jan. 4;	17.54, Nov. 1	15.25, Jan. 11;	13.08, Nov. 22

Tri-State Operations In Holiday Week Slump

Buoyancy of Demand, However, Portends Prompt Rebound — Scrap Unchanged — Advances in Sheets and Strip Forecast

PITTSBURGH, Dec. 23.—The holiday week will make a noticeable dent in ingot production in all Tri-state district steel centers. In the Pittsburgh area output is averaging eight points lower at 35 per cent. Production in the Valleys and nearby northern Ohio mills has slumped six points to 56 per cent. Output in the Wheeling district is off 10 points to 68 per cent.

The losses in average output are almost entirely ascribable to the Christmas holiday, which will find most mills inactive for one or two days, with some open-hearth and Bessemer departments down for a little longer period. In no case, however, are extended shutdowns being forced by the trend in demand for finished steel. All sales offices in the Pittsburgh district report a sustained movement of finished products, no hold-ups having been requested despite the approach of the year-end. The unusually sustained movement at this season is considered a confirmation of previous indications that stocks of steel in consumers' hands are small.

Although some prices for semi-finished and finished steel will become generally effective on Jan. 1, price consideration at this time is not so paramount as actual consuming demands. The semi-finished price advances will remain nominal well into January, since producers will not observe so closely the so-called fourth quarter shipping deadline Dec. 31.

Talk of higher prices for finished steel again is spreading, and there are now some vague indications that adjustments upward in sheets, strip steel and possibly wire goods will be made some time in first quarter. Meanwhile concessions on attractive tonnage business have not entirely disappeared.

Pig Iron

Activity during the holidays likely will slacken, but prolonged interruptions in melting in this district will not be the general rule. Shipping releases are appearing with unusual regularity for the season, indicating in many instances a movement into immediate consumption. Contracting for first quarter has not been in important volume. The award of a contract by the Pennsylvania Railroad for air brakes in this district may create a demand for malleable pig iron.

Semi-Finished Steel

Shipments of rerolling billets, slabs, blooms, sheet bars and wire rods will be interrupted only for a short interval over the Christmas holiday, since there is continued pressure from detached mills for supplies booked prior to the general price advance on semi-finished steel. Some suppliers will extend fourth quarter commitments for shipment well into January, with the result that new prices will remain only nominally effective.

Bars

Although the total volume of incoming business is depressed by holiday influences, the trend in automotive demand seems to be upward, while from other sources interest is unusually steady. Stocks of merchant bars are not heavy in most cases. This absence of unwieldy inventories portends a sustained movement in the fore part of January. Large-lot buyers continue to shop diligently for lower prices, but quotations appear to be more resistant to such pressure.

Cold-Finished Bars

Losses of tonnage owing to the holidays will not be so heavy as usual. Demand is well sustained from a variety of sources, with automotive business still failing to play a major role. No general holdup in shipments is in prospect for the so-called inventory period. The base price will be advanced $3 a ton to 2.10c. a lb., Pittsburgh, on all new business after Dec. 31.

Plates and Shapes

The barge market is fairly active. The Tri-State Transportation Co., Morgantown, W. Va., has awarded a contract for six coal barges, requiring 920 tons of small shapes and plates, to American Bridge Co. No plate and shape orders have yet reached mills here for the Pennsylvania Railroad car building program and this prospective tonnage is one of the brightest spots in the early first quarter outlook.

Awards of structural steel reported here in the past week were largely for State bridge construction, while fresh inquiries were disappointingly few. Of interest is a projected manufacturing plant at Carney's Point, N. J., for the duPont company, which will require 1800 tons.

Owing to the rush character of most projects under way, fabricating plants in this district will suspend operations only on Christmas Day.

Tubular Goods

With inventory-taking not a large factor in this market, shipments will not be affected seriously by the year-end influences. Although the total volume of shipments is not unusually large, demand for oil-country goods and mechanical tubing is considered quite satisfactory. Demand for locomotive boiler tubes seems to be gaining. Standard pipe requirements are only fair at this season.

Strip Steel

Shut-downs over the holidays will be cut short in this district as a result of a strong demand for hot and cold-rolled strip from automobile and parts makers. There is no serious let-down in demand from miscellaneous sources. Rolling schedules consequently will be geared to a high rate after the holidays. In the present week holiday recesses will probably force the average output down to well below 50 per cent.

Tin Plate

Holiday shut-downs will more than cut in half recent production this week to below 40 per cent of capacity. Some mills will not operate their hot mills for about a week. A few orders are straggling in for miscellaneous fill-in lot needs. Unshipped stocks in mill warehouses are unusually heavy, and the carryover into next year probably will keep production on a

more moderate scale than has recently prevailed, in the early part of the first quarter.

Sheet Steel Piling

The Miami, Fla., council has sent to Washington a resolution that the tonnage of sheet piling for water front improvements be divided as follows: Jones & Laughlin Steel Corpn., 2022 tons; Carnegie-Illinois Steel Corpn., and Inland Steel Co., 674 tons each; and Kalman Steel Corpn., 230 tons. Approval by the Public Works Administration is expected this week.

Wire

Demand for merchant items has been affected adversely by heavy snows in certain areas, and, with the season for distribution of merchant wire starting after Jan. 15, the volume of wire shipments has narrowed. Offsetting this trend somewhat is a steady movement of manufacturers' wire. Mills in this district will curtail schedules only one or two days during the holiday week, and output will probably regain recent levels after Jan. 1.

Sheets

Many mills will be inactive for a two-day period this week, and operations are estimated roughly at 40 to 50 per cent of capacity. After the holiday lull, however, output will snap back to previous levels, since backlogs still are substantial and will carry some units through January. Demand from the automotive industry is strong, taxing to the limit, at least one producer's capacity of automobile sheets.

Coal and Coke

Although extremely cold weather is taxing retail yards for supplies, heavy stocks of domestic coal and coke laid in some weeks ago are keeping replacements on a moderate scale. The inventory period also is a seasonal deterrent to both domestic and industrial demand. Pending the set-up of a price structure under the Guffey act, quotations are not clearly definable.

Scrap

The customary holiday lull in consumer demand has failed to dampen trade sentiment in this market. Of significance is an almost total absence of shipping deferments at this time, when low inventories and high cash positions are usually paramount to mills. In fact, the value of some scrap now being delivered will look better in inventories if based on published quotations than on unfilled orders. Dealer offering prices for No. 1 steel now range from $14 to $14.25. Few sellers would book that grade freely at $14.50, with some dealers suggesting that $15 would probably rule on a large purchase.

Cast Iron Pipe

Westfield, Mass., opens bids Dec. 27 on 1000 ft. of 8-in. and 300 ft. of 6-in. pipe.

Belleville, N. J., has awarded contract for pipe to R. D. Wood Co. for water system at $11,659.

Orange Grove, Tex., plans pipe lines for water system. Fund of $46,000 has been arranged through Federal aid for this and other waterworks installation.

Whitney Nashville Waterworks Co., Whitney, Idaho, is considering call for new bids (former bids received have been rejected) for 4761 ft. 4-in., and 6344 ft. 3-in. for water system, replacing present lines.

Pittsburg, Cal., plans pipe lines for water system; also other waterworks installation. A. Kempkey, Hobart Building, San Francisco, is consulting engineer.

McCammon, Idaho, plans pipe lines for water system. Bond election will be held Dec. 31 to vote fund of $30,700, to be increased to $47,300 through Federal aid for this and other waterworks installation.

Birmingham, Ala., plans water pipe lines, including main 60-in. trunk line from supply station on Blackburn Fork of Warrior River to water reservoir to be built near Mount Pinson, about nine miles, and smaller pipe for connection with main city lines and for city distribution. Fund of $2,378,000 has been approved for this and other waterworks construction. J. D. Webb is city engineer in charge.

Scanlon, Minn., plans pipe lines for water system. Fund of $25,000 has been secured through Federal aid.

Floyd, Va., will soon take bids for pipe lines for water supply. Fund of $32,000 has been arranged through Federal aid for this and other waterworks installation.

Atwater, Cal., has voted bonds for $50,000 for pipe lines for water system and other waterworks installation. Cost about $71,600, remainder of fund to be secured through Federal aid. W. E. Bedesen, Merced, Cal., is consulting engineer.

Henderson, Tex., plans pipe lines for water system, including main supply line. Fund of $16,000 has been arranged.

Lynchburg, Va., awarded contract to Lynchburg Foundry Co., for 42,226 ft., for main supply line from Pedlar aqueduct, new source of water for city, at $401,907.

Elba, Neb., plans pipe lines for water system; also other waterworks installation. Fund of $21,800 has been arranged through Federal aid.

Seattle, Wash., has placed 100 tons of 6, 12 and 16-in. with United States Pipe & Foundry Co.

Galt, Cal., awarded 225 tons of 4 and 6-in. with American Cast Iron Pipe Co.

Amity, Ore., has awarded 165 tons of 4 to 8-in. through a general contractor's letting.

Los Angeles Department of Water and Power has purchased 100 tons of 6-in. from Crane Co.

Quick Test of Guffey Act Now Assured

WASHINGTON, Dec. 23—Early decision by the United States Supreme Court on the constitutionality of the Guffey-Snyder coal act is expected as the result of the action of the court today in acceding to a joint request of the Government and attorneys for J. Walter Carter, president of the Carter Coal Co., for a quick test of the law. At the same time the court agreed to hear two Guffey-Snyder test cases on appeal from a decision by the Federal district court in Louisville, Ky.

Weekly Indications of Steel Activity

From THE IRON AGE

	Dec. 23, 1935	Dec. 17, 1935	Nov. 26, 1935	Dec. 24, 1934	Average Year to Date 1935	1934
Steel ingot operations—Per cent of capacity	48.5	55.5	56.0	36.5	48.1	37.1

	Week Ended				Year to Date	
	Dec. 23, 1935	Dec. 17, 1935	Nov. 26, 1935	Dec. 24, 1934	1935	1934
Fabricated structural steel awards	17,555	24,400	23,100	11,200	743,515	748,355
Fabricated plate awards	4,900	24,015	1,530	467	167,287	115,934
Sheet steel piling awards	180	2,500	180	2,800	63,500	76,500
Reinforcing bar awards	5,700	15,700	6,700	2,760	315,865	182,351

Chicago Steel Rate Drops To 53½ Per Cent

Heavy January Demand Is Indicated —Implement Plants Increase Schedules—Wabash Orders Rails

CHICAGO, Dec. 23.—Ingot output starts the week down 7½ points to 53½ per cent of capacity. Mills will be down Christmas day. At least nine openhearths will not resume heats after the holiday, as one mill swings into an extensive repair program which will be completed in about three weeks.

The entire picture, insofar as the first quarter is concerned, is promising. Speculative purchases of pig iron are being taken in full, and unexpected increases in melt have eaten heavily into stocks in the hands of consumers. There will be some carryover of semi-finished steel, but on all finished products shipments have been kept close to actual consumption.

The trend of the steel movement early in January is clearly indicated by the fact that specifications are the heaviest of the year. Tractor plants are still operating at full capacity and farm implement manufacturers are starting schedules that at the outset will top 1935 by at least 25 per cent.

Shipments remain steady and at a high rate, and it is now certain that fourth quarter books will be practically cleared of tonnage. The carryover in inventories, while large, is not expected to be troublesome, because in most cases melts are exceeding expectations. First quarter buying is at a fair level.

Rails

The Wabash has placed 10,000 tons, the division being among Bethlehem, Carnegie-Illinois and Inland. A Western railroad is about to enter the market for 9000 tons. Accessory departments are still engaged at capacity.

Plates

The Sante Fe budget, which allows for 570 cars, is a potential source of added plate business. New car programs are moving slowly and in the meantime railroad shops are pressing hard to meet repair requirements. Utilities are being pressed to meet demand for electric power. Close to $4,000,000 will be expended for a new power plant at Cincinnati and other like projects are in the making.

Bars

A seasonal drop in demand is in evidence, but so far it is very small. Forgers, though still very busy, report that releases from automobile centers are moderately lighter. Every word that comes from agricultural implement manufacturers stresses their confidence that 1936 will climb above 1935 in total sales. Contracting remains slow.

Sheets

The miscellaneous trade shows further seasonal recession in demand, but the change is for less than is usually to be expected in the second half of December. Jobbers, though distributing fair quantities, show no inclination to add to obligations at mills.

Structural Material

Structural fabricators expect to work on WPA projects until some time in March. Plans for many projects have not yet been prepared. On others no bids were received. On some only one bid was entered. The point is that if the job was under way before Dec. 15 it can be contracted for after that date. Private work is very light, being confined almost wholly to a few railroad repair orders.

Reinforcing Bars

Shop operations hold close to 50 per cent of capacity and will probably not climb higher until after the passing of mid-winter. An early cold spell is now holding back outdoor work. The rush of WPA work is still on and it may continue through January. Many projects were started before Dec. 15, but contracts were not signed and additional paper work will be permitted on them. There is almost a total absence of private work and most public jobs call for small tonnages. Prices still lean toward the weak side.

Wire Products

Demand from manufacturers is holding steady and the outlook is good for the early part of the new year. Wire sellers and jobbers view the farm situation with a great deal of satisfaction. The feeling is universal that farm income will continue to climb in 1936 and that farmers' purchases of wire products will be large. The change in method of quoting to the trade is in full effect. First quarter contracting, though not heavy, is considered satisfactory, all things considered.

Scrap

Although cold weather has set in, it is not accompanied by deep snow and yards are not seriously handicapped. This influence, therefore, cannot be counted on to add strength to a market in which supplies are ample and prices have a tendency to sag. Mill maintenance work is about to curtail acceptances. Dealers' paying prices for heavy melting steel are not above $13.25 a gross ton. From all outward appearances the scrap situation will mark time during the next few weeks.

Financial Incentives Increase Earnings

THE earning power of American wage earners cannot be measured solely on the basis of hourly or weekly wages, according to the findings of the National Industrial Conference Board in connection with a recent nationwide investigation of the industrial relations policies. This investigation, covering 2452 business establishments and over 4,500,000 employees, shows that opportunities for increasing income are available to employees in a large proportion of business concerns. This represents the first release of data from the board's census of industrial relations policies of companies which employ 15.5 per cent of those gainfully occupied in manufacturing, mining, public utilities, transportation and communication, wholesale and retail trade, and finance.

Most frequently the opportunity to earn higher than the standard wage is provided through incentive wage plans. More than half of the companies in manufacturing industries have piece rates in effect

and nearly a third use premium and bonus payment systems.

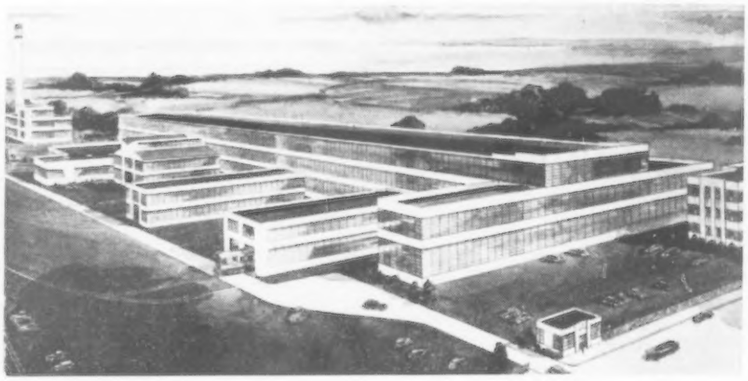
Financial rewards for usable suggestions from employees for improving product or methods are provided by 566 of the companies, and patent agreements, assuring inventive employees a specified return from inventions adopted by the company, are reported by 376 concerns employing nearly two million workers.

Profits are shared with employees in the case of 115 companies. The payment of special bonuses for long service is reported by 177 concerns; for high quality of work, by 156; and for regular attendance, by 72 companies. Special incentives for foremen are in effect in 377 companies and for executives, in 354 concerns.

A greater proportion of large concerns offer financial incentives than in the case of small establishments. Patent agreements, for example, are in force in 42 per cent of the 136 companies having more than 5000 employees, but in only 6 per cent of the 230 establishments with less than 100 workers. Of the large employers 54 per cent have suggestion plans as compared with only 4 per cent in the case of the small concerns. The difference is less marked in the case of incentive wage systems and special bonuses.

Financial incentives are found more frequently in manufacturing than in non-manufacturing establishments. This is especially true in the case of wage incentives. Among manufacturing industries, financial rewards for various accomplishments are most common in the automobile, chemicals, electrical, iron and steel, and rubber industries.

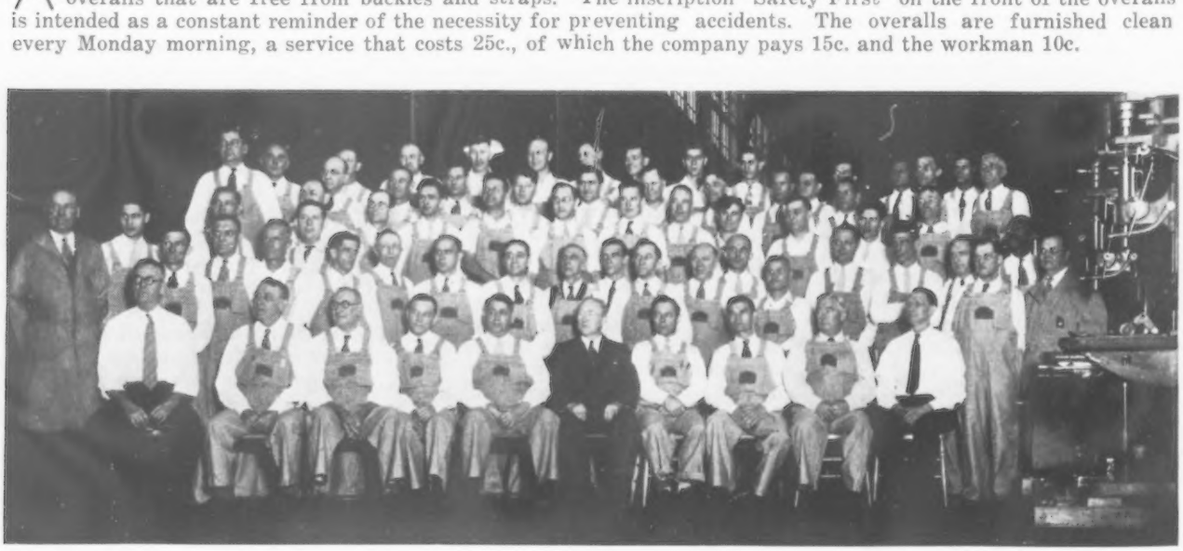
While companies that offer special financial rewards to employees are numerous in all parts of the country, the northeast and north central sections have somewhat larger proportions of such companies.



A 70-acre tract of land at McCook, Ill., has been purchased by Electro-Motive Corpn. as the site for the new Diesel-electric locomotive plant which this subsidiary of General Motors Corpn. plans to have in operation by next fall. The plant will be the first complete factory for the exclusive manufacture of Diesel-electric locomotives in the country. As shown in the attached architect's drawing, it will consist of nine buildings, the largest of which will be 550 ft. long by 170 ft. wide. The contract for the erection has been let to the Austin Co., Cleveland. Construction will be of steel, concrete, brick and glass. All of the 2000 tons of structural steel framework will be welded in the shop and field. The main erecting aisle of the erecting and machine shop building will have a 104-ft. clear span, 49 ft. high. It will be served by one 200-ton and two 30-ton electric traveling cranes. Two 20-ton cranes will be provided in the machine shop.

"Safety" Overalls as an Aid to Accident Prevention

AS a part of its safety program the Fosdick Machine Tool Co. has equipped every man in its shop with safety overalls that are free from buckles and straps. The inscription "Safety First" on the front of the overalls is intended as a constant reminder of the necessity for preventing accidents. The overalls are furnished clean every Monday morning, a service that costs 25c., of which the company pays 15c. and the workman 10c.



Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

	Soft Steel	Base per Lb.
F.o.b.	Pittsburgh	1.85c.
F.o.b.	Chicago	1.90c.
F.o.b.	Gary	1.90c.
F.o.b.	Duluth	2.00c.
Del'd	Detroit	2.00c.
F.o.b.	Cleveland	1.90c.
F.o.b.	Buffalo	1.95c.
Del'd	Philadelphia	2.16c.
Del'd	New York	2.20c.
F.o.b.	Birmingham	2.00c.
F.o.b.	cars dock Gulf ports	2.25c.
F.o.b.	cars Pacific ports	2.40c.

Rail Steel

(For merchant trade)

F.o.b.	Pittsburgh	1.70c.
F.o.b.	Chicago	1.75c.
F.o.b.	Gary	1.75c.
F.o.b.	Moline, Ill.	1.75c.
F.o.b.	Cleveland	1.75c.
F.o.b.	Buffalo	1.80c.
F.o.b.	Birmingham	1.85c.
F.o.b.	cars dock Gulf ports	2.10c.
F.o.b.	cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b.	Pittsburgh	2.05c.
F.o.b.	Chicago	2.10c.
F.o.b.	Gary	2.10c.
Del'd	Detroit	2.20c.
F.o.b.	Cleveland	2.10c.
F.o.b.	Youngstown	2.10c.
F.o.b.	Buffalo	2.10c.
F.o.b.	Birmingham	2.10c.
F.o.b.	cars dock Gulf ports	2.45c.
F.o.b.	cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b.	Pittsburgh	1.90c.
F.o.b.	Chicago	1.95c.
F.o.b.	Gary	1.95c.
F.o.b.	Cleveland	1.95c.
F.o.b.	Youngstown	1.95c.
F.o.b.	Buffalo	1.95c.
F.o.b.	Birmingham	1.95c.
F.o.b.	cars dock Gulf ports	2.30c.
F.o.b.	cars dock Pacific ports	2.30c.

Iron

F.o.b.	Chicago	1.80c.
F.o.b.	Terre Haute, Ind.	1.75c.
F.o.b.	Louisville, Ky.	2.10c.
F.o.b.	Danville, Pa.	1.80c.
F.o.b.	Berwick, Pa.	1.70c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	1.95c.
F.o.b. Chicago	2.00c.
F.o.b. Gary	2.00c.
F.o.b. Cleveland	2.00c.
F.o.b. Buffalo	2.05c.
Del'd Detroit	2.15c.
Del'd eastern Michigan	2.20c.

* In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

	Base per Net Ton
F.o.b. Pittsburgh	$54.00
F.o.b. Chicago	54.00
F.o.b. Duluth	55.00
F.o.b. Cleveland	54.00
F.o.b. Birmingham	57.00
F.o.b. Houston, Orange, Beaumont, Galveston	63.00
F.o.b. Mobile	62.00
F.o.b. New Orleans, Lake Charles, Corpus Christi	63.00
F.o.b. cars dock Pacific ports	67.00

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Coatesville	1.90c.
F.o.b. Sparrows Point	1.90c.
Del'd Philadelphia	1.99c.
Del'd New York	2.09c.
F.o.b. Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Chicago	1.85c.
Del'd Cleveland	1.995c.
F.o.b. Buffalo	1.90c.
F.o.b. Bethlehem	1.90c.
Del'd Philadelphia	2.015c.
Del'd New York	2.0625c.
F.o.b. Birmingham (standard)	1.95c.
F.o.b. cars dock Gulf ports	2.20c.
F.o.b. cars dock Pacific ports	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.35c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.16c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. cars dock Pacific ports	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.71c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. cars dock Pacific ports	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10, gage, del'd Phila.	2.81c.
No. 10 gage, f.o.b. Birmingham	2.65c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.26c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 f.o.b. cars dock Pacific ports	3.50c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Phila.	3.41c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. cars dock Pacific ports	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.40c.
F.o.b. Gary	3.50c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
No. 20, f.o.b. Gary	3.20c.
No. 20, f.o.b. Birmingham	3.70c.
No. 20, f.o.b. cars dock Pacific ports	3.70c.
No. 10, f.o.b. Pittsburgh	2.50c.
No. 10, f.o.b. Gary	2.60c.
No. 10, f.o.b. Birmingham	3.10c.
No. 10, f.o.b. cars dock Pacific ports	3.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific Coast ports	3.35c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	1.95c.
Cooperage stock, Chicago	2.05c.

Cold-Rolled Strips

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

Hot-Rolled Rail Steel Strips

	Base per Lb.
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade Per Lb.

Bright wire	2.30c.
Spring wire	2.90c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.40
Smooth coated nails	2.40

Base per 100 Lb.

Annealed fence wire	$2.45
Galvanized fence wire	2.80
Polished staples	3.10
Galvanized staples	3.35
Barbed Wire galvanized	2.80
Twisted barbless wire	2.80
Woven wire fence, base column	61.00
Single loop bale ties, base column	53.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are $2 a ton over Pittsburgh (except for woven wire fence at Duluth, which is $5 over Pittsburgh), and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh, while Pacific Coast prices are $8 over Pittsburgh. Exception: on fence wire Pacific Coast price are $11 a ton above Pittsburgh.

On staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

Wire Hoops, Twisted or Welded

	Off List
F.o.b. Pittsburgh	35 and 2½ off
F.o.b. Chicago	35 off

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel Inches	Black	Galv.	Wrought Iron Inches	Black	Galv.
⅛	51½	29½	⅛	+9	1½ +13
¼ to ⅜	53½	35	¼ & ⅜	+1½	+21½
½	58½	47	½	31½	15
¾	62	52	¾	36½	20½
1 to 3	64	55	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	60	51	2	37	22½
2½ to 3	63	54	2½ to 3½	38	25
3½ to 6	65	56	4 to 8	40	28½
7 and 8	64	54	9 to 12	38	24½
9 and 10	63½	53½			
11 and 12	62½	52½			

Butt Weld, extra strong, plain ends

⅛	48½	33½	⅛	+13	+45½
¼ to ⅜	51	38	¼ & ⅜	+2½	+34½
½	56½	47½	½	32½	17½
¾	61	52	¾	37½	22½
1 to 3	63	55	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2½ to 3	62	54	2½ to 4	45½	33
3½ to 6	65½	57½	4½ to 6	45	33½
7 and 8	64½	54½	7 & 8	46	33
9 and 10	63½	53½	9 to 12	41½	30
11 and 12	62½	52½			

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1½ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2¼ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	21.45	19.50
3½ in. o.d.	11 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extras for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

Lapweld Steel and Knobbled Charcoal Iron Pressure Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

		Steel	Iron
1½ in. o.d.	13 B.W.G.	$ 9.72	$20.16
1¾ in. o.d.	13 B.W.G.	11.00	21.84
2 in. o.d.	13 B.W.G.	12.38	17.23
2¼ in. o.d.	13 B.W.G.	13.79	19.58
2½ in. o.d.	12 B.W.G.	16.58	24.19
2¾ in. o.d.	12 W.B.G.	17.54	26.40
3 in. o.d.	12 B.W.G.	18.35	28.39
3¼ in. o.d.	11 B.W.G.	21.56	33.95
3½ in. o.d.	11 B.W.G.	23.15	36.16
4 in. o.d.	10 B.W.G.	28.66	45.36
4½ in. o.d.	10 B.W.G.	35.22	50.48
5 in. o.d.	9 B.W.G.	44.25	61.86
6 in. o.d.	7 B.W.G.	68.14	102.46

Quantity Extras:

40,000 lb. or ft.	base
25,000 lb. or ft. to 39,999 lb. or ft.	plus 5%
10,000 lb. or ft. to 24,999 lb. or ft.	plus 12½ %
2,000 lb. or ft. to 9,999 lb. or ft.	plus 25%
Under 2,000 lb. or ft.	plus 40%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$48.40
*4-in., del'd Chicago	51.40
6-in. and larger, del'd New York	45.20
4-in., del'd New York	48.20
*6-in. and larger, Birmingham	40.00
*4-in. Birmingham	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	48.50
4-in., f.o.b. dock, San Francisco or Los Angeles	51.00
F.o.b. dock, Seattle	51.50
Class "A" and gas pipe, $3 extra.	

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39. Birmingham, and $47.40, delivered Chicago, and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

RAILROAD MATERIALS

Rails and Track Supplies

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes, 9/16 in. and larger	$2.60
Spikes, ½ and smaller	2.60
Tie plates, steel	1.90
Tie plates, Pacific Coast ports	2.00
Track bolts, to steam railroads	3.60
Track bolts, no jobbers, all sizes (per 100 count)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Buffalo, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; on spikes alone, Cleveland, Youngstown, Lebanon, Pa., Columbia, Pa., Richmond, Va.

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts: ½ in. x 6 in. and smaller..70, 10 and 5
Larger than ½ in. .....70 and 10
Lag bolts .....70 and 10
Plow bolts, Nos. 1, 2, 3 and 7 heads .....70 and 10
Hot-pressed nuts, blank or tapped, square .....70 and 10
Hot-pressed nuts, blank or tapped, hexagon .....70 and 10
C.p.c. and t. square or hex. nuts, blank or tapped .....70 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes to and incl. 1 in. diameter .....60, 20 and 15
Larger than 1 in. diameter.60, 20 and 15
Stove bolts in packages, Pittsburgh 72½ and 10
Stove bolts in packages, Chicago, 72½ and 10
Stove bolts in packages, Cleveland, 72½ and 10
Stove bolts in bulk, Pittsburgh.....82½
Stove bolts in bulk, Chicago.....82½
Stove bolts in bulk, Cleveland.....82½
Tire bolts 55

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland.....$2.90
F.o.b. Chicago 3.00
F.o.b. Birmingham 3.05

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70 and 5
F.o.b. Cleveland .....70 and 5
F.o.b. Chicago and Birm'g'm.....70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller .....80, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller..... 75
Milled headless set screws, cut thread ¾ in. and smaller 75
Unset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. and smaller.. 85
Unset set screws, cut and oval points .....75 and 10
Milled studs .....65 to 65 and 10

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Uncropped .....$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $49 a gross ton.

Alloy Steel Bars

Price del'd Detroit is $52.

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.
Open-hearth grade, base .....2.45c.
Delivered price at Detroit is.....2.60c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo. 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% NI. 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Rerolling slabs	15c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

Raw and Semi-Finished Steel

Carbon Steel Rerolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.
Uncropped ....$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham.
Uncropped .....$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

Per Gross Ton

Rerolling $29.00
Forging quality 35.00

Delivered Detroit

Rerolling $32.00
Forging 38.00

Billets Only F.o.b. Duluth

Rerolling $31.00
Forging 37.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer.....$30.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved ..... 1.80c.
Universal ..... 1.80c.
Sheared ..... 1.80c.

Wire Rods

(Common, base)

Per Gross Ton

F.o.b. Pittsburgh $40.00
F.o.b. Cleveland 40.00
F.o.b. Chicago 41.00
F.o.b. Anderson, Ind. 41.00
F.o.b. Youngstown 41.00
F.o.b. Worcester, Mass. 42.00
F.o.b. Birmingham 43.00
F.o.b. San Francisco 49.00
F.o.b. Galveston 46.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	$20.50	$21.00	$20.00	$21.50
Bethlehem, Pa.	20.50	21.00	20.00	21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Swedeland, Pa.	20.50	21.00	20.00	21.50
Steelton, Pa.	....	....	20.00	....
Sparrows Point, Md.	20.50	....	20.00	....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Youngstown	19.50	19.50	19.00	20.00
Buffalo	19.50	20.00	18.50	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Cleveland	19.50	19.50	19.00	20.00
Toledo, Ohio	19.50	19.50	19.00	20.00
Jackson, Ohio	21.25	21.25	20.75	....
Detroit	19.50	19.50	19.00	20.00
Hamilton, Ohio	19.50	19.50	19.00	20.00
Chicago	19.50	19.50	19.00	20.00
Granite City, Ill.	19.50	19.50	19.00	....
Duluth, Minn.	20.00	20.00	....	20.50
Birmingham	15.50	15.50	14.50	20.00
Provo, Utah	17.50	....	17.00	....

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District From Everett, Mass.	$21.00	$21.50	$20.50	$22.00
Brooklyn From East. Pa.	22.9289	23.4289	22.4289	23.9289
Newark or Jersey City, N. J. From East. Pa.	21.9873	22.4873	21.4873	22.9873
Philadelphia From Eastern Pa.	21.3132	21.8132	20.8132	22.3132
Cincinnati From Hamilton, Ohio	20.5807	20.5807	20.0807	21.0807
Canton, Ohio From Cleveland and Youngstown	20.8402	20.8402	20.3402	21.3402
Columbus, Ohio From Hamilton, Ohio	21.64	21.64	....	....
Mansfield, Ohio From Cleveland and Toledo	21.3832	21.3832	20.8832	21.8832
Indianapolis From Hamilton, Ohio	21.9289	21.9289	....	....
South Bend, Ind. From Chicago	21.6935	21.6935	....	....
Milwaukee From Chicago	20.57	20.57	....	....
St. Paul From Duluth	21.94	....	....	....
Davenport, Iowa From Chicago	21.3832	21.3832	....	....
Kansas City From Granite City	22.2178	22.2178	....	....
San Francisco, Los Angeles or Seattle. From Provo	22.315	....	....	....

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.....$24.00

GRAY FORGE PIG IRON

Valley furnace $19.00
Pittsburgh district furnace 19.00

CHARCOAL PIG IRON

Lake Superior furnace $22.00

Delivered Chicago 25.2528

Delivered Buffalo 25.595

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75.....$21.00
No. 2 fdy., sil. 1.75 to 2.75..... 20.50
Malleable 22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75.....$22.50
No. 2 fdy., sil. 1.75 to 2.25..... 22.00
Malleable 22.50
Basic 22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $85.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $26.00
50-ton lots 3-mo. shipment 24.00
F.o.b. New Orleans 26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $77.50
50% (ton lots) 85.00
75% (carloads) 126.00
75% (ton lots) 136.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6.00 to 6.50%	$22.75	12%	..$29.25
6.51 to 7.00%	23.25	13%	.. 30.75
7.00 to 7.50%	23.75	14%	.. 32.25
7.51 to 8.00%	24.25	15%	.. 33.75
8.00 to 8.50%	24.75	16%	.. 35.25
8.51 to 9.00%	25.25	17%	.. 36.75
9.00 to 9.50%	25.75		
9.51 to 10.00%	26.25		
10.00 to 10.50%	26.75		
10.51 to 11.00%	27.25		
11.00 to 11.50%	27.75		
11.51 to 12.00%	28.25		

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10.00 to 10.50%	$27.75	13%	..$31.75
10.51 to 11.00%	28.25	14%	.. 33.25
11.00 to 11.50%	28.75	15%	.. 34.75
11.51 to 12.00%	29.25	16%	.. 36.25
12%	30.25	17%	.. 37.75

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained T. del., carloads $1.30
Ferrotungsten, lots of 5000 lb..... $1.35
Ferrotungsten, smaller lots 1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered. In car loads 10.0%c
Ferrochromium, 2% carbon .....16.50c. to 17.00c.
Ferrochromium, 1% carbon .....17.50c. to 18.00c.
Ferrochromium, 0.10% carbon .....19.50c. to 20.00
Ferrochromium, 0.06% carbon .....20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V. .....$2.70 to $2.90
Ferrocarbontitanium, 15 to 18% Ti, 6 to 8% C. f.o.b. furnace carload and contract per net ton..$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage..... 50.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton with $2.75 unitage 65.00
Ferromolybdenum, per lb. Mo., del. 95c.
Calcium molybdate, per lb. Mo., del. ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, carloads $38.00
Ton lots or less, per ton..... 45.50
Silico-manganese, gross ton, delivered.
2.50% carbon grade 90.00
2% carbon grade 95.00
1% carbon grade 105.00
Spot prices ..... $5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$14.00 to $14.50
No. 2 heavy melting steel	12.50 to 13.00
No. 2 railroad wrought	14.25 to 14.75
Scrap rails	14.25 to 14.75
Rails, 3 ft. and under	15.50 to 16.00
Compressed sheet steel	14.00 to 14.50
Hand bundled sheet steel	12.50 to 13.00
Hvy. steel axle turnings	11.50 to 12.00
Machine shop turnings	9.75 to 10.25
Short shov. turnings	9.75 to 10.25
Short mixed borings and turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
Cast iron carwheels	14.00 to 14.50
Heavy breakable cast	12.50 to 13.00
No. 1 cast	14.00 to 14.50
Railr. knuckles and couplers	15.75 to 16.25
Rail. coil and leaf springs	15.75 to 16.25
Rolled steel wheels	15.75 to 16.25
Low phos. billet crops	16.50 to 17.00
Low phos. sheet bar crops	16.00 to 16.50
Low phos. punchings	15.75 to 16.25
Low phos. plate scrap	15.25 to 15.75
Steel car axles	15.00 to 15.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$13.00 to $13.50
Automobile hvy. melt steel	11.50 to 12.00
Shoveling steel	13.00 to 13.50
Hydraulic comp. sheets	12.25 to 12.75
Drop forge flashings	10.75 to 11.25
No. 1 busheling	11.75 to 12.25
Rolled carwheels	14.00 to 14.50
Railroad tires	14.00 to 14.50
Railroad leaf springs	14.00 to 14.50
Axle turnings	12.50 to 13.00
Steel couplers and knuckles	14.00 to 14.50
Coil springs	15.00 to 15.50
Axle turnings (elec. fur.)	13.25 to 13.75
Low phos. punchings	14.00 to 14.50
Low phos. plates, 12 in. and under	14.25 to 14.75
Cast iron borings	6.00 to 6.50
Short shoveling turnings	6.00 to 6.50
Machine shop turnings	6.50 to 7.00
Rerolling rails	13.50 to 14.00
Steel rails, less than 3 ft.	14.50 to 15.00
Steel rails, less than 2 ft.	15.00 to 15.50
Angle bars, steel	14.00 to 14.50
Cast iron carwheels	13.25 to 13.75
Railroad malleable	15.75 to 16.25
Agricultural malleable	9.50 to 10.00

	Per Net Ton
Iron car axles	$16.00 to $16.50
Steel car axles	14.00 to 14.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.75 to 12.25
No. 2 busheling, new	9.00 to 9.50
No. 2 busheling, old	6.50 to 7.00
Locomotive tires, smooth	12.00 to 12.50
Pipes and flues	7.00 to 7.50
No. 1 machinery cast	11.75 to 12.25
Clean automobile cast	11.00 to 11.50
No. 1 railroad cast	10.50 to 11.00
No. 1 agricultural cast	10.25 to 10.75
Stove plate	7.00 to 7.50
Grate bars	8.50 to 9.00
Brake shoes	8.50 to 9.00

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.50
No. 2 heavy melting steel	$11.00 to 11.50
Hydraulic compressed, new	11.50 to 12.00
Hydraulic compressed, old	8.50 to 9.00
Steel rails for rolling	14.00 to 14.50
Cast iron carwheels	13.00 to 13.50
Heavy breakable cast	12.00
No. 1 cast	13.00 to 13.50
Stove plate (steel works)	9.00 to 9.50
Railroad malleable	14.50 to 15.00
Machine shop turnings	7.50 to 8.00
No. 1 blast furnace	6.00
Cast borings	6.00
Heavy axle turnings	9.50 to 10.00
No. 1 low phos. heavy	15.00 to 16.00
Couplers and knuckles	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Steel axles	16.00 to 16.50
Shafting	18.00 to 18.50
No. 1 railroad wrought	12.00 to 12.50
Spec. iron and steel pipe	9.75 to 10.25
Bundled sheets	10.50 to 11.00
No. 1 forge fire	10.50 to 11.00
Cast borings (chem.)	10.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$10.50 to $11.00
No. 2 heavy melting steel	8.50 to 9.00
Scrap rails for melting	9.75 to 10.25
Loose sheet clippings	6.50 to 7.00
Bundled sheets	7.75 to 8.25
Cast iron borings	6.00 to 6.50
Machine shop turnings	6.25 to 6.75
No. 1 busheling	7.75 to 8.25
No. 2 busheling	4.25 to 4.75
Rails for rolling	10.75 to 11.25
No. 1 locomotive tires	9.00 to 9.50
Short rails	13.50 to 14.00
Cast iron carwheels	10.00 to 10.50
No. 1 machinery cast	11.00 to 11.50
No. 1 railroad cast	10.25 to 10.75
Burnt cast	7.75 to 8.25
Stove plate	7.75 to 8.25
Agricultural malleable	9.75 to 10.25
Railroad malleable	11.00 to 11.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$12.75 to $13.25
No. 2 heavy melting steel	11.75 to 12.25
Compressed sheet steel	12.25 to 12.75
Light bundled sheet stampings	9.25 to 9.75
Drop forge flashings	11.75 to 12.25
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.75 to 8.25
No. 1 busheling	11.50 to 12.00
Steel axle turnings	10.75 to 11.25
Low phos. billet crops	16.00 to 16.50
Cast iron borings	7.50 to 8.00
Mixed borings and short turnings	7.50 to 8.00
No. 2 busheling	7.50 to 8.00
No. 1 cast	13.50 to 14.00
Railroad grate bars	7.00 to 7.50
Stove plate	7.50 to 8.00
Rails under 3 ft.	15.50 to 16.00
Rails for rolling	15.50 to 16.00
Railroad malleable	16.50 to 17.00
Cast iron carwheels	12.75 to 13.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$12.00 to $12.50
No. 2 heavy melting scrap	11.00 to 11.50
Scrap rails	12.00 to 12.50
New hydraul. comp. sheets	11.00 to 11.50
Old hydraul. comp. sheets	9.00 to 9.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.00 to 11.50
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	6.50 to 7.00
Knuckles and couplers	13.00 to 14.00
Coil and leaf springs	13.00 to 14.00
Rolled steel wheels	13.00 to 14.00
Low phos. billet crops	14.50 to 15.00
Short shov. steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
No. 2 busheling	7.00 to 7.50
Steel car axles	12.50 to 13.00
Iron axles	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 cupola cast	11.50 to 12.00
Stove plate	10.00 to 10.50
Steel rails, 3 ft. and under	14.50 to 15.00
Cast iron carwheels	12.00 to 12.50
Railroad malleable	15.00 to 15.50
Chemical borings	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:

*No. 1 heavy melting steel	$9.75
No. 1 heavy melting steel	$7.40 to 7.90
*Scrap rails	9.75 to 10.00
*No. 2 steel	8.75
No. 2 steel	6.40 to 6.90
Breakable cast	6.75 to 7.00
Machine shop turnings	3.40 to 3.65
*Machine shop turnings	5.25 to 5.50
Bundled skeleton, long	6.75 to 6.90
Forge flashings	6.00 to 6.25
Shafting	13.00 to 13.25
Steel car axles	12.50 to 13.00
Cast iron borings, chemical	5.00 to 7.00
*No. 1 textile cast	9.10 to 9.25
*Stove plate	6.75 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	9.75 to 10.00
No. 1 machinery cast	9.25 to 9.50
Stove plate	6.00 to 6.50
Railroad malleable	11.00 to 11.50

* Delivered local army base.

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$8.50 to *†9.00
No. 2 heavy melting steel	7.50 to *†8.00
Heavy breakable cast	7.00 to 7.50
No. 1 machinery cast	8.00 to 8.50
No. 2 cast	*†7.50
Stove plate	*†6.75
Steel car axles	13.50 to 14.00
Shafting	13.50 to 13.75
No. 1 railroad wrought	8.50 to 9.00
No. 1 yard wrought long	7.50 to 8.00
Spec. iron and steel pipe	6.00 to 6.50
Forge fire	6.50 to 7.00
Rails for rolling	9.00 to 10.00
Short shoveling turnings	3.50 to 4.00
Machine shop turnings	3.50 to 4.00
Cast borings	3.50 to 3.75
No. 1 blast furnace	2.00 to 2.50
Cast borings (chemical)	10.00 to 11.00
Unprepared yard iron and steel	4.50 to 5.00

Per gross ton, delivered local foundries:

No. 1 machinery cast	$11.00
No. 1 hvy. cast (cupola size)	9.50
No. 2 cast	8.00

† Loading on barge.

*50c. higher offered at nearby New Jersey points.

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	7.00
Stove plates	7.00
Steel axles	11.50 to 12.00
Iron axles	11.50
No. 1 railroad wrought	8.50
Rails for rolling	12.50
No. 1 cast	10.50 to 11.00
Tramcar wheels	10.00 to 10.50

ST. LOUIS

Dealers' buying prices per gross ton delivered consumers' works:

Selected heavy steel	$11.00 to $11.50
No. 1 heavy melting	10.75 to 11.25
No. 2 heavy melting	9.00 to 9.50
No. 1 locomotive tires	9.75 to 10.25
Misc. stand-sec. rails	11.50 to 12.00
Railroad springs	12.00 to 12.50
Bundled sheets	7.50 to 8.00
No. 2 railroad wrought	10.50 to 11.00
No. 1 busheling	6.50 to 7.00
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	12.50 to 13.00
Machine shop turnings	2.75 to 3.25
Heavy turnings	8.00 to 8.50
Steel car axles	12.50 to 13.00
Iron car axles	15.00 to 16.00
No. 1 railroad wrought	8.50 to 9.00
Steel rails less than 3 ft.	13.00 to 13.50
Steel angle bars	12.50 to 13.00
Cast iron carwheels	9.00 to 9.50
No. 1 machinery cast	11.25 to 11.50
Railroad malleable	13.25 to 13.75
No. 1 railroad cast	10.00 to 10.50
Stove plate	7.50 to 8.00
Agricult. malleable	11.75 to 12.25

DETROIT

Dealers' buying prices per gross ton:

Heavy melting steel	$9.50 to $10.00
Borings and short turnings	$5.25 to $5.75
Long turnings	5.00 to 5.50
No. 1 machinery cast	12.50 to 13.00
Automotive cast	13.00 to 13.50
Hydraulic comp. sheets	9.75 to 10.25
Stove plate	7.75 to 8.25
New factory busheling	9.00 to 9.50
Old No. 2 busheling	5.00 to 5.50
Sheet clippings	7.25 to 7.75
Flashings	8.50 to 9.00
Low phos. plate scrap	10.50 to 11.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$8.00	$7.50
Rails, scrap	8.50	8.00
Machine shop turnings	3.50	3.50
Boiler plate	5.00	5.00
Heavy axle turnings	4.50	4.00
Cast borings	4.50	4.00
Steel borings	3.00	3.00
Wrought pipe	4.00	4.00
Steel axles	8.00	8.50
Axles, wrought iron	8.00	8.50
No. 1 machinery cast	9.50	9.00
Stove plae	6.50	6.00
Standard carwheels	7.75	7.00
Malleable	7.50	7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer 51.50% iron	4.65
Messabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron dry Spanish or Algeria	10.25c.
Iron, low phos., Swedish, average 68½% iron	10.25c.
Iron, basic or foundry, Swedish, aver. 65% iron	9.50c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Manganese, Caucasian, washed 52%	26c.
Manganese, African, Indian, 44-48%	24c.
Manganese, African, Indian, 49-51%	26c.
Manganese, Brazilian, 46 to 48½%	24c.

	Per Net Ton Unit
Tungsten, Chinese, wolframite, duty paid, delivered	$15.75 to $16.00
Tungsten, domestic, scheelite delivered	15.50 to 16.00

	Per Gross Ton
Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to $17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic Seaboard	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines for all rail shipment	$16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	20.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$3.50 to $3.65
Foundry, f.o.b. Connellsville Prompt	4.00 to 5.75
Foundry, by-product, Chicago ovens, for delivery outside switching district	9.00
Foundry, by-product, delivery in Chicago switching district	9.75
Foundry, by-product, New England, delivered	11.50
Foundry, by-product, Newark or Jersey City, del'd	9.24 to 9.72
Foundry, by-product, Phila.	9.03
Foundry, by-product, Clevelanda, delivered	9.75
Foundry, Birmingham	6.00
Foundry, by-product, St. Louis f.o.b. ovens	$8.00
Foundry, by-product, del'd St. Louis	9.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.90 to 2.10
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	0.90 to 1.15
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.25c.
No. 4 industrial	3.87½c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	4.75c.
No. 5 industrial fuel oil	3.75c.

	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.50c.
No. 4 industrial	5.25c.
No. 5 industrial	4.00c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$45.00	$40.00
Maryland	45.00	40.00
New Jersey	50.00	43.00
Ohio	45.00	40.00
Kentucky	45.00	40.00
Missouri	45.00	40.00
Illinois	45.00	40.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	55.00
Silica clay, per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard, f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa.	$45.00
Domestic, f.o.b. Baltimore and Chester	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.95c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock:	
Rounds and hexagons	3.20c.
Squares and flats	3.20c.
Hoops and bands under ¼ in.	3.20c.
Hot-rolled anealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count,	65 per cent off list.
Machine bolts, 100 count,	65 per cent off list.
Carriage bolts, 100 count,	65 per cent off list.
Nuts, all styles, 100 count,	65 per cent off list.
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb	*2.70
Wire, galv. soft, base per 100 lb.	*2.925
Common wire nails, per keg	*2.834
Cement coated nails, per keg	*2.834

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lbs.

*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.

Plates and structural shapes	3.20c.
Soft steel bars, rounds	3.00c.
Soft steel bars, squares and hexagons	3.15c.
Cold-fin. steel bars:	
Rounds and hexagons	3.35c.
Flats and squares	3.35c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (keg lots)	3.50c.
Track bolts (keg lots)	4.65c.
Rivets, structural (keg lots)	3.65c.
Rivets, boiler (keg lots)	3.75c.

Per Cent Off List

Machine bolts	*70
Carriage bolts	*70
Lag screws	*70
Hot-pressed nuts, sq. tap. or	
Hot-pressed nuts, sq. tap or blank	*70
Hot-pressed nuts, hex. tap or	
Hot-pressed nuts, hex. tap or blank	*70
Hex. head cap screws	87½
Cut point set screws	80
Flat head bright wood screws..50 and	20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.85
Com. wire nails, base per keg	2.95†
Cement c't'd nails, base per keg	2.95†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, rounds	3.31c.
Iron bars	3.31c.
Iron bars, swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.81c.
Flats and squares	3.81c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.56c.
Bands	3.56c.
Hot-rolled sheets (No. 10)	3.31c.
Hot-rolled ann'l'd sheets (No. 24*)	3.89c.
Galvanized sheets (No. 24*)	special
Long terne sheets (No. 24)	5.25c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.40c.
Wire, galv. (No. 10)	3.75c.
Tire steel, 1 x ½ in. and larger	3.75c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	$3.21

Per Cent Off List

Machine bolts, square head and nut:	
All diameters	70 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$15.03
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron 4-in.	62.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.45c.
Bars, soft steel (rounds and flats)	3.25c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.40c.
Cold-fin. rounds, shafting, screw stocks	3.60c.
Hot-rolled annealed sheets (No. 24)	4.10c.
Galv. sheets (No. 24)	4.65c.
Hot-rolled sheets (No. 10)	3.30c.
Black corrug. sheets (No. 24)	4.10c.
*Galv. corrug. sheets	4.65c.
Structural rivets	4.00c.
Boiler rivets	4.10c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts: All quantities	70

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.98c.
*Structural shapes	2.98c.
*Soft steel bars, small shapes, iron bars (except bands)	3.03c.
‡Reinforc. steel bars, sq. twisted and deformed	2.96c.
Cold-finished steel bars	3.61c.
*Steel hoops	3.43c.
*Steel bands, No. 12 and 3/16 in. incl.	3.18c.
Spring steel	5.00c.
†Hot-rolled aneal. sheets (No. 24)	3.65c.
†Galvanized sheets (No. 24)	4.40c.
*Hot-rolled annealed sheets (No. 10)	3.08c.
Diam. pat. floor plates, ¼ in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.31c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.10c.
Cold-finished steel bars	3.25c.
Flat-rolled steel under ¼ in.	3.36c.
Cold-finished strip	†3.00c.
Hot-rolled anealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
*Black ann'l'd wire, per 100 lb.	$2.75
*No. 9 galv. wire, per 100 lb.	3.10
*Com. wire nails, base per keg	2.70

†Outside delivery 10c. less.

*For 5000 lb. or less.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.42c.
Bars, rounds, flats and angles	3.22c.
Other shapes	3.37c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.47c.
Cold-finished bars	3.57c.
Hot-rolled annealed sheets (No. 24)	4.02c.
Galv. sheets (No. 24)	4.72c.
Hot-rolled sheets (No. 10)	3.22c.
Structural rivets	4.35c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain, 1in. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

Base per Lb.

Plates	3.38c.
Struc. shapes	3.25c.
Soft steel bars	3.05c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.40c.
Round and hex.	3.40c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.06c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.63c.
Galv. sheets (No. 24)	4.70c.
Bands	3.43c.
Hoops	3.43c.
Heavy hot-rolled sheets	3.18c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb. (2500-lb. lots or under)	3.55
(Over 2500 lb.)	3.45

BOSTON

Base per Lb.

Beams, channels, angles, tees, zees	3.54c.
H beams and shapes	3.54c.
Plates—Sheared, tank and univ. mill, ¾ in. thick and heavier	3.56c.
Floor plates, diamond pattern	5.36c.
Bar and bar shapes (mild steel)	3.45c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.65c. to 4.65c.
Half rounds, half ovals, ovals and bevels	4.70c.
Tire steel	4.70c.
Cold-rolled strip steel	3.245c.
Cold-finished rounds, squares and hexagons	3.90c.
Cold-finished flats	3.75c.
Blue annealed sheets, No. 10 ga.	3.65c.
One pass cold-rolled sheets No. 24 ga.	5.20c.
Galvanized steel sheets, No. 24 ga.	5.90c.
Lead coated sheets, No. 24 ga.	6.85c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

Base per Lb.

Soft steel bars	3.09c.
Structural shapes	3.42c.
Plates	3.42c.
Floor plates	5.17c.
Hot-rolled annealed sheets (No. 24)	3.94c.
Hot-rolled sheets (No. 10)	3.14c.
Galvanized sheets (No. 24)	4.72c.
Bands	3.39c.
Hoops	3.39c.
Cold-finished bars	3.49c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.29c.*
Bolts and nuts	....70 and 5 per cent off list

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials.

*Price applies to 1,000 lb. and over.

MILWAUKEE

Base per Lb.

Plates and structural shapes	3.31c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.11c.
Soft steel bars, squares and hexagons	3.26c.
Hot-rolled strip	3.41c.
Hot-rolled sheets (No. 10)	3.16c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 20)	4.66c.
Cold-finished steel bars	3.46c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	3.86c.
Boiler rivets, cone head (keg lots)	3.96c.
Track spikes (keg lots)	3.71c.
Track bolts (keg lots)	4.86c.
Black annealed wire	3.25c.
Com. wire nails	2.95c.
Cement coated nails	2.95c.

Per Cent Off List

Machine bolts	70 and 10
Carriage bolts	70 and 10
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70 and 10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

Base per Lb.

Mild steel bars, rounds	3.25c.
Structural shapes	3.45c.
Plates	3.45c.
Cold-finished bars	3.87c.
Bands and hoops	3.55c.
Hot-rolled annealed sheets, No. 24	3.90c.
Galvanized sheets, No. 24	4.50c.
Cold-rolled sheets, No. 20	4.95c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On cold-finished bars, hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over.

BALTIMORE

Base per Lb.

*Mild steel bars	2.95c.
*Iron bars	2.95c.
*Reinforcing bars	2.95c.
*Structural shapes	3.00c.
†Plates	3.00c.
†Hot-rolled sheets, No. 10	3.10c.
‡Hot-rolled annealed sheets, No. 24	3.60c.
‡Galvanized sheets, No. 24	4.30c.
*Bands	3.20c.
*Hoops	3.45c.
§Cold-rolled rounds	3.58c.
§Cold-rolled squares, hex. and flats	3.58c.
Rivets	4.40c.
Bolts and nuts, per cent off list	..60 and 10

*Quantity extras per size apply. †Quantity extras per thickness apply. Hot-rolled quantity extras are: 2000 lb. and over, base; 1500 lb. to 1999 lb., add 15c. per 100 lb.; 1000 lb. to 1499 lb., add 30c.; 0 to 999 lb., add 50c.

‡50 bundles and over, base. For 1 to 9 bundles add 50c. per 100 lb.; for 10 to 49 bundles add 25c.

§Base for 1000 lb. and over. For 500 to 999 lb. add 25c. per 100 lb.; for 300 to 499 lb. add 75c.; for 0 to 299 lb. add $1.25.

CHATTANOOGA

Base per Lb.

Mild steel bars	3.36c.
Iron bars	3.36c.
Reinforcing bars	3.36c.
Structural shapes	3.56c.
Plates	3.56c.
Hot-rolled sheets, No. 10	3.36c.
Hot-rolled annealed sheets, No. 24	4.16c.
Galvanized sheets, No. 24	4.86c.
Steel bands	3.61c.
Cold-finished bars	3.98c.

MEMPHIS

Base per Lb.

Mild steel bars	3.47c.
Shapes, bar size	3.47c.
Iron bars	3.47c.
Structural shapes	3.67c.
Plates	3.67c.
Hot-rolled sheets, No. 10	3.47c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	4.80c.
Steel bands	3.72c.
Cold-drawn rounds	3.89c.
Cold-drawn flats, squares, hexagons	5.89c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

Base per Lb

Mild steel bars	3.35c.
Reinforcing bars	3.50c.
Structural shapes	3.55c.
Plates	3.55c.
Hot-rolled sheets, No. 10	3.55c.
Hot-rolled annealed sheets, No. 24	4.50c.
Galvanized sheets, No. 24	4.95c.
Steel bands	3.95c.
Cold-finished steel bars	4.15c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$3.05
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.50c.	3.60c.	3.55c.
Shapes, standard	3.50c.	3.60c.	3.55c.
Soft steel bars	3.50c.	3.60c.	3.70c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.25c.	4.35c.	4.40c.
Hot-rolled sheets (No. 10)	3.60c.	3.70c.	3.75c.
Galv. sheets (No. 24)	5.00c.	4.95c.	5.00c.
Cold finished steel Rounds	5.80c.	5.85c.	6.00c.
Squares and hexagons	7.05c.	7.10c.	7.25c.
Flats	7.55c.	7.60c.	8.25c.
Common wire nails —base per keg less carload	$3.20	$3.20	$3.20

All items subject to differentials for quantity.

TOOL STEEL

Prices are same for warehouse distribution at all points on or East of Mississippi River. West of Mississippi quotations are 1c. a lb. higher.

Base per Lb.

High speed	57c.
High carbon chrome	37c.
Oil hardening	22c.
Extra	17c.
Regular	14c.

Output Drops to 57 Per Cent at Cleveland

Holiday Interruption Depresses Ingot Production—Buyers Resist Advance in Wire Rods—Fluorspar Prices Stabilized

CLEVELAND, Dec. 23.—Demand for finished steel fell off only slightly during the past few days, but a tapering was more in evidence early this week and quite a letdown in the volume of business is expected through the holiday period.

Cleveland steel plants will suspend operations only 24 hr. for Christmas and are operating the same number of open-hearths as last week. The Lorain plant of the National Tube Co., suspending for the holiday, will be shut down the remainder of the week. With the holiday curtailment, ingot output in the Cleveland-Lorain district is down 25 points this week to about 57 per cent of capacity. A blast furnace was blown out in Lorain, leaving two in operation. Aside from the holiday shutdown, finishing mills in this district are continuing operation of near capacity.

The automotive industry continues to issue good releases for bars, sheets and strip steel, and agricultural implement manufacturers are placing good orders for bars. While some consumers are withholding specifications until after inventories, others have released for immediate shipment steel orders for January delivery. Contracting for the first quarter has been quite active, and most consumers are now under contract.

Buyers of wire rods are refusing to pay the $2 a ton advance in price, and there seems to be considerable uncertainty whether the advance will become effective. Consumers have placed heavy specifications at the old price, and some of the mills have set Jan. 15 as the deadline delivery date. With accumulation of large stocks, it may be well into the first quarter before there is a real test of the advanced price.

While concessions of $3 a ton on sheets are reported in Detroit, the weakness has not extended to this territory.

Bars, Plates and Shapes

Demand for bars continues very active, although not quite so heavy as a few weeks ago. Both the automobile parts makers and the manufacturers of agricultural implements are ordering freely. In structural lines there is considerable activity in small lots of fabricated shapes for private work. Considerable grade crossing elimination work is in prospect in Ohio, in addition to several jobs previously mentioned.

Pig Iron

Shipments continue heavy and there probably will be little iron left on the books to be canceled at the end of the year. Sales for the first quarter still are being made in fair volume, although many consumers are not expected to place new contracts until their old stocks are about used up. Jobbing foundries are operating in fair shape, but some are using little pig iron in their cupolas.

Sheets

While miscellaneous orders tapered off moderately with the approach of the holiday season, the volume of business from the automotive industry continues heavy. Mills are being pushed for deliveries and some have their schedules filled until Jan. 15. In the face of talk of possible price advances during the first quarter, weakness that recently appeared in the Detroit territory has become more conspicuous. Some mills are making concessions to large buyers in the Detroit territory of $3 a ton on cold-rolled and on hot-rolled annealed sheets.

Strip Steel

Considerable new business continues to come from the automobile manufacturers, and while mill backlogs are not so large as in sheets, most producers have enough business for full operations for two or three weeks.

Iron Ore

Most underground mines in the Lake Superior district are maintaining good operations and, with mine stocks well cleaned out and a promising outlook for shipments next year, many companies expect to continue present operations through the winter. Lake ore stocks at furnace yards and on docks will be approximately 3,000,000 tons less on Jan. 1 than on the same date a year ago. Shippers look for a moderate gain in movement next year over 1935.

Fluorspar

Recent irregularities in prices have been eliminated by establishing gravel fluorspar at $16 for all-rail shipment and $17.50, a 50c.-a-ton advance, for barge shipment. Books have been opened for the first quarter at these prices and most consumers are now covered for that delivery.

Bolts and Nuts

Sales and shipments in December have been practically the same as during the corresponding period in November. The advance in prices has stimulated specifications against fourth quarter contracts. Many consumers, including several automobile manufacturers, have placed contracts for the first quarter at the new prices. Inquiry is out for bolts and nuts for the 10,000 freight cars ordered by the Pennsylvania Railroad.

Scrap

Steel-making grades are very firm but inactive, and no buying is expected before January. Brokers are getting little steel-making scrap at prices they can afford to pay to fill outstanding orders. Their last sales of No. 1 heavy melting steel to Cleveland mills were at $13 and $13.75, but dealers claim they are able to buy only small lots at below $13.25. The situation is easy in respect to blast furnace grades. Foundry scrap is in good demand. There is an active call for automobile cylinder castings, but the local supply is limited. All scrap quotations are unchanged.

Ensley Rail Mill to Close in January

BIRMINGHAM, Dec. 23.—With the approach of the Christmas holidays, buying of pig iron and steel products has eased off. New tonnage was rather light last week and not much is expected this week. The pig iron market has been rather quiet for some weeks and only a small volume has been booked for the first quarter, since most foundries bought liberally before the price advance. Steel buying has been more active and, in spite of the holidays, the total for the month will be good.

The Ensley rail mill is to close Jan. 1 for a month and present

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plans call for a resumption on Feb. 1. This mill began operations Nov. 7.

Twelve blast furnaces and 12 open-hearths operated last week and the same schedule will be followed this week. There will be a 24-hr. shutdown of open-hearth furnaces and various finishing mills for Christmas Day.

Demand Maintained in Cincinnati Area

CINCINNATI, Dec. 23.—While district pig iron users are not disposed to place new business, they are accepting all the iron ordered on contracts made immediately prior to the price advance of a month ago. In fact, furnace interests report the movement of pig iron this month to be well above the year's high level of November. Melt has increased slightly among general jobbing and automobile foundries. Stove foundries, however, are reducing operations. Inquiry is nil and prices are steady.

Approach of inventory period has not affected the steady demand for finished sheets in this area. Mills have accumulated backlogs, which are estimated at about two weeks' production. Automotive ordering is at about the normal proportion of total bookings, while miscellaneous demand continues to bolster district optimism. Mill operations are at capacity.

Ingot production in the district, at 82 per cent, is on a parity with the previous week.

By-product foundry coke is moving in steady volume against contracts, as a result of good foundry operations.

The district scrap market is strong. Dealers are holding at high levels, largely in anticipation of January needs. Speculative purchasing by dealers is keeping yard supplies at high levels. Closing of recent railroad lists at good prices has added to dealer enthusiasm.

Gain in Activity At Buffalo

BUFFALO, Dec. 23.—The addition of another open-hearth furnace to the active list at Bethlehem's Lackawanna plant late last week, and its continuing operation, has brought this plant's production up to 13 open-hearths. Republic Steel Corpn. continues to operate five furnaces and Wickwire Spencer Steel Co. one. The Seneca sheet division of Bethlehem is operating at 90 per cent of capacity or better.

The imminence of the holiday period, and the fact that a great many PWA jobs are still hanging fire, made last week a dull one in the field of new reinforcing and structural steel commitments. A good many small-sized jobs were reported, but no larger ones. Weakness has developed in the reinforcing bar price situation, with certain distributors taking contracts for what they can get and relying on their ability to buy material later on at a lower price.

Warehouse business is good, with no change in prices and a reported stronger demand for alloy steel products.

Pig iron buying is limited, with furnaces occupied in clearing year-end deliveries and adjusting contracts.

The largest district scrap consumer continues to offer $12 for No. 1 heavy melting steel in the expectation of getting No. 2 for $10.50, but rceeipts are few. Dealers predict that the price will be considerably stronger by Jan. 1. No substantiation can yet be had of the reputed sale of No. 2 last week to another mill at a price of $11.25 or $11.50, though dealers customarily handling transactions for this particular consumer are known to be offering $11 for No. 2.

Steel Price Rise Forecast at St. Louis

ST. LOUIS, Dec. 23—Steel mills began last week-end to tell their customers in this territory that there was a possibility of an advance in prices of nearly all items of finished iron and steel, although it previously had been announced that prices prevailing now would be continued during the first quarter of 1936. The "hint" that there would be a reconsideration of the previous decision to let prices remain where they are and that an advance was likely is expected to stimulate buying before the end of the year. What the advance probably would amount to was not disclosed. Buying has been only for current needs, with the volume light.

Shipments of pig iron continue at a heavy rate, and it is expected that, by the end of the year, virtually all of the purchases contracted for delivery during the fourth quarter will have been taken in by the melters. There has been some buying for first quarter. It is expected some of the iron bought for shipment before Dec. 31 will be piled in the yards of melters.

The price of ferromanganese has been reduced $10 a ton to $75 a ton seaboard, effective Jan. 1, as

a result of the reciprocal trade agreement with Brazil. The price of spiegeleisen is unchanged.

The scrap market is quiet, and it is not likely there will be any trading until after the first of the year. No. 1 railroad cast has been advanced 50c. a ton and stove plate $1.

Boston Market Is Quiet

BOSTON, Dec. 23—The customary year-end quietness exists in all lines associated with the iron and steel industry. The only development of note was the fact that the steamer Seven Seas Spray, loaded with export scrap, went into collision with the Boston lightship, disabling the beacon and then returned to port for examination. There continue to be loadings of scrap for export.

Prices for scrap remained about where they were a week ago. The only change was an advance in bundled skeletons, which moved up from $6.50 to $6.75 to $6.75 to $6.90.

Warehouse interests announce an advance on cold-finished bars of $3 a ton, effective Jan. 1.

Bids are to be opened Dec. 27 on 1000 ft. 8-in. cast iron pipe and 300 ft. 6-in. pipe for Westfield, Mass.

Grade Crossing Jobs Placed on Coast

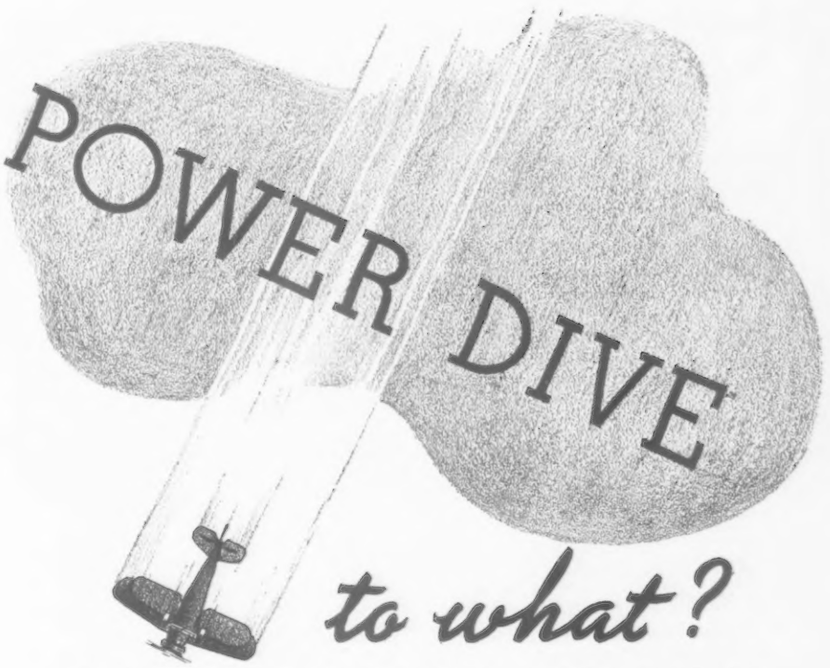
SAN FRANCISCO, Dec. 23.—With 17 general contracts on State grade crossings placed during the past week, steel bookings for the remainder of the quarter promise to be heavy. Recent steel lettings call for 3846 tons of structural steel and 3506 tons of reinforcing steel.

Truscon Steel Co. was awarded 1066 tons of bars for an overhead crossing at Albany and two other projects in northern California. At Seattle, 1500 tons of shapes for the City Street viaduct were placed with Wallace Bridge & Structural Steel Co. Mercer Steel Co. booked 300 tons of bars and 200 tons of shapes for a school at Salem, Ore. Awards have not yet been made by the Southern Pacific Co. on the 40,769 gross tons of rails and the 1000 tons of spikes and tie plates on which bids have been received.

General Motors Corpn. has opened bids at Los Angeles on a new assembly plant in which 4000 tons of structural steel are specified. Present estimates on the 16.47-mile unit of the Colorado River aqueduct, on which bids will be opened Jan. 7 by the Metropolitan Water District at Los Angeles, show that from 38,000 to 44,000 tons of plates and reinforcing bars will be required.

With the great number of pending and recently placed projects, the coming quarter wlil open with a good backlog of business. To this will be added tonnage for a number of major projects on which bids will be opened shortly after the first of the year.

Board of Education, St. Louis, will close bids Jan. 8 for the following equipment for Froebel School: One 14-in., four 13-in. and four 11-in. engine lathes, two 16-in. shapers, two milling machines, one combination furnace, one 22-in. drill press, one arbor press and one power hack saw.



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T P

Holiday Spirit Dulls Demand For Steel at Philadelphia

Sellers Continue to Talk of Higher Prices—New Item Extras for Sheets Announced

PHILADELPHIA, Dec. 23. — Total steel bookings have tapered off considerably during the past several days. But sellers are not concerned, for this condition is merely a repetition of what has happened in past years and represents a natural contraction of business during the holiday and inventory period. There is a universal expectation that demand will rebound in the first week of the new year. All district mills look for a January comparable to, if not better than, December, and the entire first quarter is expected to be fully satisfactory with regard to new business and deliveries on old orders.

Most district mills are stopping their rolling mills Tuesday afternoon, but open-hearth and rolling mill rates will return to their usual levels on Thursday. The largest producer, however, has dropped off a number of furnaces for the entire week. Consequently this district rate is down 5 points to 33 per cent of capacity. This level of activity compares very favorably with the 25 per cent rate in effect a year ago. Several of the smaller district mills are drawing on reserve ingot stocks and are of the opinion that additional furnaces will be added early in January.

The Pennsylvania Railroad has yet made no disposition of the plate and shape tonnage required for its car building program. It is understood that the total cost of these 10,000 cars will be $24,564,000, and the 4000 cars to be built in private shops will all be 50-ton box cars. The 6000 to be built in the Pennsylvania shops will consist of 1700 50-ton box cars, 3000 50-ton automobile cars, 300 70-ton steel covered hopper cars and 1000 70-ton mill-type gondola cars.

Pig Iron

Deliveries on old orders have slackened and new business has practically disappeared as foundries are curtailing production in anticipation of the forthcoming holiday period. All of the tonnages which foundries ordered to avoid first quarter price advances have not been released, but most sellers are inclined to be somewhat liberal and are not adverse to suggestions of extending delivery into the first quarter. No great volume of business has been done for first quarter, and sizable buying is not expected to appear before late January, inasmuch as most melters have comfortable stocks on hand.

Sheets and Strip

The week's foremost development was the application of higher item extras on all coated and uncoated sheet mill products with the exception of electrical sheets and formed roofing. All large producers are now using these extras on new business, and smaller mills are expected to fall in line before the end of the week. Item charges on standard sizes remain unchanged at 10c. per 100 lb. for lots of 1500 to 1000 lb. as a minimum and 75c. per 100 lb. for lots under 500 lb. as a maximum. But odd sizes must be ordered in lots over 4000 lb. to escape the item charge; this charge ranges from 25c. for quantities of 4000 lb. to 2500 lb. up to $1 per 100 lb. for lots under 500 lb. In addition to these item extras, the odd-size extra for exact quantity will remain in effect in all cases, as will the quantity extra for less-than-carload orders.

Most fabricating plants in this area are closing Tuesday afternoon and will remain inactive on Christmas Day. Full production will be resumed on Thursday, however. Most sheet and strip users are covering first quarter requirements in a modest way, but there is no conspicuous stocking despite recurring reports of contemplated price advances early in the first quarter. Although these reports of higher prices may be only a means of forcing in business, there is no denying the fact that larger sellers are advising their best customers to contract as heavily as possible. Even though mills were telling the same story a month ago and later were forced to admit their error when prices were reaffirmed, a feeling still persists that home offices have only delayed action temporarily.

Bars, Plates and Shapes

Much of the local school work and nearby road construction is tentatively in the hands of general contractors, but actual steel lettings are being delayed until formal approvals are forthcoming and financial arrangements completed. More tonnage of shapes and bars is now pending in this district than for any similar period during the past several years, but mill awards will probably not appear in any volume until mid-January. New business is currently very slack, mostly as a reflection of holiday inertia. Robinson Iron & Steel Co. will fabricate 900 tons of shapes for a Ludlow Mfg. Co. building at Edge Moor, Del., and Taylor Davis, Inc., will supply 400 tons of bars for the same building. The outstanding reinforcing award of the week was 1200 tons for the foundation of a Scranton, Pa., high school, which will be supplied by Kalman Steel Corpn. The Snelt Co. is low bidder on 4200 ft. or about 200 tons of welded pipe for the city of Trenton, N. J. American Rolling Mill Co. will probably supply this pipe.

Imports

The following iron and steel imports were received here last week: 3410 tons of pig iron from the Netherlands; 114 tons of steel bars, 60 tons of structural shapes, 34 tons of steel bands, 27 tons of steel shapes, 5 tons of diamond plates and 3 tons of hoop steel from Belgium; 113 tons of sponge iron, 54 tons of steel tubes, 46 tons of steel wire, 30 tons of steel bars, 2 tons of billet steel and 1 top of steel forgings from Sweden.

Scrap

Local brokers are still delivering No. 1 and No. 2 steel and heavy cast grades on old orders to district consumers. However, no new business has been placed and all prices are quotably unchanged. This condition will probably be maintained through the turn of the year, and there seems little doubt but what a steady if not very strong tone will prevail during early January. This expectation is based on the belief that domestic mills will come into the buying market within the next two or three weeks and, in addition, it is likely that buying for export will be resumed on a heavier scale. At present only occasional carloads are being delivered to Port Richmond. However, a boat is expected in momentarily to take out an 8000-ton cargo.

The Railroad Credit Corpn. will make a liquidating distribution on Dec. 31 of $735,885, or one per cent, to participating carriers. This will be the twenty-third of such distributions and will bring the total to $29,435,398, or 40 per cent of the fund administered under the terms of the 1931 plan.

Reinforcing Steel

Awards 5700 Tons—New Projects 1060 Tons

AWARDS

Scranton, Pa., 1200 tons, foundation for high school, to Kalman Steel Corpn.

Edge Moor, Del., 400 tons, Ludlow Mfg. Co. building, to Taylor Davis, Inc.

New York, 800 tons, WPA sewer project in Bronx, to Joseph T. Ryerson & Son, Inc.

Salem, Ore., 300 tons, senior high school, to Mercer Steel Co.

Grand County, Utah, 102 tons, State bridge over Upper Courthouse Wash, to an unnamed bidder.

Pierce County, Wash., 1142 tons, Nisqually River bridge, to an unnamed bidder.

Wilmington, Cal., 233 tons, State overhead crossing, to Pacific Coast Steel Corpn.

San Francisco, 267 tons, Sunshine Buena Vista school, to Truscon Steel Co.

Albany, Cal., 514 tons, State overhead crossing, to Truscon Steel Co.

Oakland, Cal., 285 tons, Grove Street wharf, to Truscon Steel Co.

Tejon, Cal., 111 tons, State bridge, to an unnamed bidder.

San Gabriel, Cal., 100 tons, Union church, to an unnamed bidder.

Vale, Ore., 220 tons, Unity dam on Burnt River, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Louisville, Ky., 2500 tons, overpass; Henry Bickel Co., Louisville, low bidder on general contract.

San Francisco, 100 tons, Agassiz school; new bids Dec. 27.

San Francisco, 310 tons, shop buildings at Marina Junior high school; bids opened.

Tucson, Ariz., 100 tons, addition at Deaf and Blind School; bids opened.

Fullerton, Cal., 200 tons, building at junior college; bids opened.

Los Angeles, 100 tons, gymnasium at Manual Arts high school; bids opened.

Taft, Cal., 200 tons, administration building at Taft high school; bids opened.

Tempe, Ariz., 150 tons, dormitory at Arizona Teachers College; bids opened.

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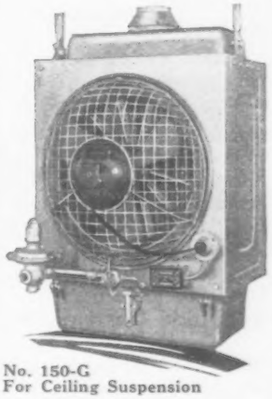

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Pipe Lines

Consumers Power Co., Jackson, Mich., plans new welded steel pipe line from Millbrook natural gas fields, Mecosta and Montcalm counties, to Lansing, Mich., and vicinity, about 60 miles, for commercial gas supply. Branch steel lines will be built to East Lansing, Grand Ledge, Hastings, Williamston, Fowlerville and other municipalities in this district, making a total of 26 communities to secure gas service from new lines. Cost about $500,000.

Supervising Construction Engineer, United States Indian Service, Billings, Mont., closes bids Dec. 30 for 6960 ft. of steel pipe for Crow Agency, Mont., including valves, fittings, etc.

American Oil Co., American Building, Baltimore, plans 6-in. steel pipe line on Monongahela River, vicinity of Granville, near Point Marion, W. Va. for gasoline service in connection with barge unloading at that place.

Barnsdall Pipeline Co., 1546 West Main Street, Oklahoma City, Okla., affiliated with Barnsdall Refineries, Inc., Barnsdall, Okla., is considering new welded steel pipe line from oil field district at Placedo, Tex., to Harbor Island, Tex., about 50 miles, for crude oil transmission. Cost over $350,000.

Arcadia, Cal., will soon take bids for about 12,000 ft. of steel pipe for water system. Fund of $79,000 has been arranged, including Federal grant of about one-half such sum. Currie Engineering Co., Andreson Block, San Bernardino, Cal., is consulting engineer.

Metropolitan Water District, 306 West Third Street, Los Angeles, F. E. Weymouth, chief engineer and general manager, closes bids Jan. 17 for about 16½ miles of 12-ft. diameter steel pipe, with alternate bids on precast concrete pipe, extending from Cajalco reservoir to point about 10 miles from San Bernardino, Cal., for water supply in connection with Colorado River Project (Specifications 137).

Southern California Gas Co., Los Angeles, has approved plans for new 10 and 12-in. welded steel pipe line from natural gas field district at Semitropic, Cal., to connection with main trunk line near Los Angeles, about 9½ miles, for natural gas transmission; also for new 6, 8 and 10-in. welded steel pipe line from gas field at Kettleman, Cal., to Fresno and Visalia, Cal., about 25 miles, for similar service. Project will be handled from company division offices at Taft, Cal., W. C. Cameron, division manager.

Holiday Lull Is Minimized In Metropolitan Territory

Large Projects Await January Action, But Miscellaneous Demand Continues at Fair Rate — Railroads and Ship Yards Active

NEW YORK, Dec. 23.—The usual holiday slump in demand for finished steel products is not so pronounced this year as it ordinarily is. Many steel consumers are operating part of the week and the majority plan to resume activity next week at the same levels at which they had been running. Under the circumstances, demand for small lots of material for rush delivery are still reaching local mill representatives, although many of them cannot be filled until January.

Railroad track spikes are in particularly heavy demand because of the price advance scheduled for Jan. 1. However, most of the producers have taken all the business they can accommodate at the old quotation. Cold-finished steel bars are affected in the same way, but the financial resources of many small miscellaneous consumers do not permit speculative covering in a large way.

Railroad activity is still a feature of the market, but repair parts constitute the bulk of the business in this district. The New York Central is expected to make formal inquiry for 30,000 to 40,000 tons of rails and accessories in the first week of the new year. This road took Clayton Act bids last week on its first quarter general steel requirements.

Award of the 15,000 tons of steel required for the new vessel tentatively placed by the United States Lines with the Newport News Shipbuilding & Dry Dock Co. is being held up pending approval of a PWA loan to cover the greater part of the cost of construction. The three ferry boats which United Dry Docks, Inc., will build for the City of New York will require only about 2000 tons of plates, shapes and bars instead of 4500 tons as originally estimated. The steel has not been placed. The United States Naval Station, Newport, R. I., will take bids Jan. 3 on a ferry boat calling for 500 tons of plates and shapes.

James Stewart & Co., Inc., New York, was low bidder on the section of the West Side elevated highway from Forty-third to Fifty-ninth Street, Manhattan, which will require 12,000 tons of shapes. George M. Brewster & Sons, Inc., Mason & Hanger Co. and Underpinning & Foundation Co. were respective low bidders on three contracts covering the New Jersey approach to the Midtown Hudson tunnel, which calls for about 5000 tons of steel in the aggregate.

The Albany Steel & Iron Supply Co., Albany, N. Y., has been awarded the contract for New York State license plates calling for about 1650 tons of strip steel. It is reported that the tonnage will be rolled by the Youngstown Sheet & Tube Co.

Reinforcing steel bar contracts placed in this immediate area continue to suffer by comparison with other sections of the country. Last week little new business came to the surface. In the Bronx 800 tons was awarded Joseph T. Ryerson & Son, Inc., for the intercepting sewer project in connection with the Wards Island disposal plant. Rodgers & Haggerty are the general contractors. Other public works jobs loom large with respect to pending tonnages.

Pig Iron

The market for pig iron in this area has been uneventful, but indications are that there is more interest in the metal than appears on the surface. While sales declined to approximately 850 tons from the 1450 tons booked two weeks ago, producers report many questions being asked with respect to the market in general. First quarter orders are light, though here and there 100-ton lots have been contracted for. Foundry operations, on the whole, have tapered off since Dec. 1, and additional signs of declining activity have been evident during the past week.. At least one local establishment, however, experienced a pickup in its business during the week. The heavy rate of shipments noticeable for some time has about exhausted unfilled orders on certain pig iron sellers' books, but other factors report a considerable quantity still to be moved.

Scrap

Development of a stronger tone in the export market has been the feature of the past week. Despite the fact that Italian interests are prepared to buy a considerable tonnage of No. 2 steel, no transactions have been reported and brokers are still able to pick up small tonnages for immediate boat loading against old orders. New buying is apparently being stymied by the reluctance of prospective purchasers to make firm offers and the fact that sellers are disinclined to make extensive short commitments at this time. The domestic market is affected by the usual holiday dullness, with shipments being held up at several eastern Pennsylvania consuming points. Foundries are also generally inactive this week and will resume operations next week only on a restricted basis. Dealer buying prices of scrap are quotably unchanged. The City of New York took bids Saturday on a wide variety of small scrap lots and will sell additional material Dec. 28.

TRADE NOTES

Salem Engineering Co., Salem, Ohio, has removed offices and works of the subsidiary company, Salem Engineering Co. of Canada from Toronto to Welland, Ont. Company has acquired manufacturing facilities at Welland and intends carrying on manufacture of full line of electrically heated and fuel fired industrial furnaces. A. T. Greiner is resident manager.

Electric Air Heater Co., division of American Foundry Equipment Co., 555 Byrkit Street, Mishawaka, Ind., will exhibit complete line of electric air heaters in space No. 625 at the Fourth International Heating, Ventilating and Air Conditioning Exposition.

Flexible Shaft Equipment, R. G. Haskins Co., 4636 West Fulton Street, Chicago—New general catalog No. 44, covering line of flexible shaft equipment. In addition to complete specifications for the machines, booklet treats of many applications of this type of equipment in various industries and contains illustrations.

During the last year 409 Detroit factory employees of the Packard Motor Car Co. completed 10 years of unbroken service with the company. In accordance with an annual custom for 19 years, each was presented with a gold watch, the presentation being made personally by the president.

British Pig Iron Output to Rise In January — Coal Strike Predicted

LONDON, Dec. 23 (*By Cable*).—Pig iron is quiet, but pressure for deliveries is unrelaxed, and increased output promised in January will be readily absorbed.

Steel makers are busy. Prospects of higher wages for coal miners are causing anxiety regarding the future. Pressure for semi-finished steel is increasing and makers are unable to handle further orders. Ship builders' specifications are expanding and the railroads are placing large rolling stock orders.

The tin plate market is unsettled by a 1s. increase in the coal price to Welsh users and a threatened coal strike in January. Owing to further overselling by Welsh makers, no export sales for shipment in any month may now be made. Holiday conditions prevail in the home trade.

The Continental iron and steel export business is quiet because of heavy purchases in October and November and the usual year-end influences.

At a meeting of the International Rail Makers' Association the American group agreed to transfer part of its quota and the Continental group one-half of one per cent of its quota to the British group.

THE annual mining institute, given under the auspices of the college of mines, University of Washington, Seattle, for the past eight years, will again be held in 1936 during the week of Jan. 20. Meetings are scheduled at mines laboratory on the university campus each day except Saturday when a field trip is taken to some point of mining or metallurgical interest. Lectures and laboratory demonstrations are given by members of the staff and faculty of the college of mines dealing with mining, metallurgy, ceramics, and related fields.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9	
Billets, open-hearth	£5 10s.	to £5 15s.
Tin plate, per base box	18s. 9d.	to 19s. 3½d.
Steel bars, open-hearth	£7 17½s.	
Beams, open-hearth	£7 7½s.	
Channels, open-hearth	£7 12½s.	
Angles, open-hearth	£7 7½s.	
Black sheets, No. 24 gage	£9 15s.	
Galvanized sheets, No. 24 gage	£11 15s.	

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £

Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2	7s.	
Wire rods, No. 5 B.W.G.	£4	10s.	
Steel bars, merchant	£3	5s.	
Sheet bars	£2	8s.	
Plate, ¼ in. and up	£4	2s.	6d.
Plate, 3/16 in. and 5 mm.	£4	4s.	8d.
Sheets, ¼ in.	£4	9s.	8d.
Beams, Thomas	£3	2s.	6d.
Angles (Basic)	£3	2s.	6d.
Hoops and strip base	£4	2s.	6d.
Wire, plain, No. 8	£5	7s.	6d.
Wire nails	£5	15s.	
Wire, barbed, 4 pt. No. 10 B.W.G.	£8	15s.	

Carboloy-precision-boring hard C.I. cylinders on Ex-Cell-O P.B. Machine. 400 S.F.P.M., .008" feed, cut 6" lg. x .008" per side, .0003" max. limits for round, straight and surface variations.

"Borising" wrist pins, holes of aluminum pistons using Heald No. 49 Borematic. 2000 r.p.m. Feed per minute: 8" rough, 4" finish. Depth of cut: .020" rough, .010" finish. Carboloy tooled.

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Holiday Season Interrupts Demand for Non-Ferrous Metals

November Lead Shipments Are Heaviest Since July, 1933—Tin Price Is Lower But Other Metals Are at Unchanged Levels

NEW YORK, Dec. 23.—The advent of the holiday season has disrupted the metal trade to some extent, and conditions are more quiet generally. Week-end sales of copper, amounting to 1856 tons, brought the month's total bookings to slightly over 35,000 tons. Adverse foreign conditions are acting as a restraint upon possible higher prices, and less discussion of the subject is currently noticeable. Producers feel, however, that the lax state of buying in existence for quite some time should result in a movement to replace stocks by consumers before long. Prolonged and heavy shipments have given every indication that consumption has been well maintained. The tone of the market, though quiet, is therefore quite firm, and prices hold at the 9.25c. a lb. level. In London, electrolytic is quoted at 8.60c. a lb. to 8.65c.

Lead

This market has at length shown definite indications of a contraction in demand, but the approach of the holidays and stock-taking periods can be held partly accountable. Combined with an uncovered January position of about 40 per cent and the fact that February books will be opened next week, the prospects are that consumers will resume purchasing policies once the year is over. The price is firm at the 4.50c. a lb. level. November statistics, which appeared last week, received much favorable comment. Refined shipments rose to 43,023 tons. Total production was 39,957 tons, and stocks on Nov. 30 were 222,236 tons. Compared with October the figures show a rise in deliveries of 752 tons, a decrease in production of 2661 tons, and a drop in stocks of 3073 tons. Shipments have not been so heavy since July, 1933, and while forecasts closely approximated the November total, interest was reawakened by the release of official statistics.

Zinc

The market has shown no appreciable change since last reported. The undertone remains very firm, with prices supported at the 4.85c. a lb. level. Sales figures for last week are not yet available, though it is known that buying tendencies were quiet, in keeping with the non-ferrous situation generally.

Tin

Year-end tendencies for activity in this commodity to subside are definitely apparent. Importers did practically no business last week, and spot premiums accordingly tapered off. Today the price for spot Straits metal at New York is 48.62½c. a lb. In London this morning standard quotations were £216 15s for prompt and £208 10s for futures. The Eastern price was £214 15s. Tin arrivals of all grades to this country so far in December total about 1600 tons. While spot metal is still far from plentiful, the utter lack of interest recently noticed was responsible for the weakening in prices.

Ingot Brass and Bronze

The Non-Ferrous Ingot Metal Institute reports that combined deliveries of brass and bronze ingots and billets by its members totaled 5944 tons in November. In October, deliveries were 6294 tons.

The Carnegie-Illinois Steel Corpn. has awarded contracts for electric cranes at the new 100-in. sheared plate mill, now under construction at Homestead, Pa., to Alliance Machine Co., Alliance, Ohio; Whiting Corpn., Harvey, Ill., and Shaw-Box & Crane Hoist Co., Inc., Muskegon, Mich.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 18	Dec. 19	Dec. 20	Dec. 21	Dec. 23	Dec. 24
Electrolytic copper, N. Y.*	9.00	9.00	9.00	9.00	9.00	...
Lake copper, N. Y.	9.37½	9.37½	9.37½	9.37½	9.37½	...
Straits tin, spot, New York†	49.37½	49.25	49.00	...	48.62½	...
Zinc, East St. Louis	4.85	4.85	4.85	4.85	4.85	...
Zinc, New York†	5.22½	5.22½	5.22½	5.22½	5.22½	...
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	...
Lead, New York	4.50	4.50	4.50	4.50	4.50	...

*Refinery quotations; price ¼c. higher delivered in Connecticut.
†Includes emergency freight charge.

Aluminum, virgin 99 per cent plus, 19.00c.-22.00c. a lb., delivered.
Aluminum, No. 12 remelt, No. 2 standard, in carloads, 17.00c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.50c. a lb., New York.
Quicksilver, $74.00 to $75.00 per flask.
Brass ingots, commercial 85-5-5-5, 9.25c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	50.00c. to 51.00c.
Tin, bar	48.00c. to 49.00c.
Copper, Lake	10.25c. to 11.25c.
Copper, electrolytic	10.25c. to 11.25c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	16.25c.
*High brass sheets	14.62½c.
*Seamless brass tubes	16.62½c.
*Seamless copper tubes	16.75c.
*Brass rods	13.12½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	6.00c. to 7.00c.
Lead, sheets	8.25c.
Antimony, Asiatic	17.00c. to 18.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	54.25c.
Tin, bar	56.25c.
Copper, Lake	10.25c.
Copper, electrolytic	10.25c.
Copper, castings	10.00c.
Zinc, slabs	6.25c. to 6.50c.
Lead, American pig	5.20c. to 6.50c.
Lead, bar	8.50c.
Antimony, Asiatic	17.50c.
Babbitt metal, medium grade	19.25c.
Babbitt metal, high grade	58.25c.
Solder, ½ and ½	30.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.12½c.	7.87½c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.00c.	6.50c.
Brass, heavy	4.00c.	4.62½c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.00c.	6.50c.
No. 1 yel. brass turnings	5.12½c.	5.62½c.
No. 1 red brass or compos. turnings	5.62½c.	6.12½c.
Lead, heavy	3.50c.	3.87½c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.
Sheet aluminum	13.25c.	14.75c.

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Manufacturers of a Complete Line of Accident Prevention Equipment

Fabricated Structural Steel

Awards and New Projects Slightly Lower

AWARDS of 17,555 tons compare with 24,400 tons last week. Sizable awards include 2540 tons for a hospital in New York and 1500 tons for a viaduct in Seattle. New projects total 13,480 tons as against 17,150 tons in the previous week and 19,350 tons two weeks ago. New jobs include 2000 tons for a city hall and court house in Nashville, Tenn., and 1800 tons for a manufacturing plant for the Du Pont company. Plate awards call for 4900 tons, with only 1000 tons pending. Structural steel contracts in December totaled 76,380 tons, compared with 76,680 tons in November. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Boston, 1460 tons, Chelsea Street bridge, to McClintic-Marshall Corpn.

New York, 2540 tons, pavilion for Bellevue Hospital, to Bethlehem Fabricators, Inc.

New York, 1184 tons, West Bedford Park Boulevard viaduct, to Bethlehem Fabricators, Inc.

New York, 200 tons, H-beams for Bronx intercepting sewers in connection with Ward's Island disposal plant, Contract No. 11, to Bethlehem Fabricators, Inc.

Neville Island, Pa., 380 tons, alterations to Emsworth lock and dam, to American Bridge Co.

Amcelle, Md., 250 tons, die house for Celanese Corpn., to Guibert Steel Co.

Westfield, Mass, 200 tons, nurses' home, to Harrmann Steel Co.

Malden, Mass., 140 tons, bridge, to New England Structural Co.

Emsworth, Pa., 313 tons, lock and dam, to American Bridge Co.

Edge Moor, Del., 910 tons, building for Ludlow Mfg. Co., to Robinson Iron & Steel Co.

Staten Island, N. Y., 244 tons, health center, to an unnamed bidder.

Greene County, N. Y., 290 tons, State highway bridge, to McClintic-Marshall Corpn.

Rensselaer County, N. Y., 890 tons, bridge, to Phoenix Bridge Co.

New York, 105 tons, tunnel approach to George Washington bridge, to McClintic-Marshall Corpn.

New York, 100 tons, repairs to Williamsburg bridge, to Vulcan Rail & Construction Co.

Brooklyn, 160 tons, alterations to building No. 10, to Frank M. Weaver.

New York, 200 tons, Procurement Division Treasury Department, Orchard Branch, Bronx, to Belmont Iron Works.

College Park, Md., 130 tons, experimental station for Bureau of Mines, to Barber & Ross.

SOUTH AND SOUTHWEST

St. Augustine, Fla., 190 tons, post office, to Bristol Steel & Iron Co.

Frankfort, Ky., 1030 tons, Kentucky River State bridge, to Wisconsin Bridge & Iron Co.; previously reported to Virginia Bridge & Iron Co.

Chattanooga, Tenn., 1100 tons, plant buildings for United States Pipe & Foundry Co.; 550 tons each to Virginia Bridge & Iron Co., and Converse Bridge & Steel Co.; entire award previously reported to Converse Bridge & Steel Co.

Houston, Tex., 525 tons, bridge for Southern Pacific Railroad, to Virginia Bridge & Iron Co.

Fort McClelland, Ala., 120 tons, gymnasium and assembly hall, to Ingalls Iron Works Co.

Lorton, Va., 110 tons, filtration plant, to Chicago Bridge & Iron Works.

Dublin, Ga., 135 tons, post office, to Johnson City Foundry & Machine Co.

CENTRAL STATES

Milwaukee, 400 tons, storage house E, Schlitz brewery, to Milwaukee Bridge Co.

Two Harbors, Minn., 600 tons, extension to ore dock, American Bridge Co.

Hand Station, Mich., 425 tons, overhead crossing, to R. C. Mahon Co.

Marquette, Mich., 135 tons, post office, to Hansell-Elcock Foundry Co.

Winnebago County, Wis., 195 tons, highway bridge, to Fort Pitt Bridge Works Co.

Rensselaer, Ind., 146 tons, St. Joseph's College, to New City Iron Works.

Jamestown, N. D., 214 tons, medical building, to Crown Iron Works.

Fremont, Ohio, 115 tons, Sandusky County court house, to Klein Structural Steel Co.

WESTERN STATES

Casper, Wyo., 196 tons, tunnel supports on Casper canal, to an unnamed bidder.

Pierce County, Wash., 175 tons, Nisqually River bridge, to Wallace Bridge & Structural Steel Co.

Ediz Hook, Wash., 100 tons, Coast Guard barracks, to Isaacson Iron Works.

Seattle, Wash., 1500 tons, City Street viaduct, to Wallace Bridge & Structural Steel Co.

Seattle, 250 tons, bridge and towers for Light Department, to Wallace Bridge & Structural Steel Co.

Whittier, Cal., 100 tons, post office, to Pacific Coast Steel Corpn.

Los Angeles, 170 tons, alterations on Union high school, to Pacific Iron & Steel Co.

Wilmington, Cal., 650 tons, State overhead crossing, to Pacific Coast Steel Corpn.

Salem, Ore., 200 tons, senior high school, to Mercer Steel Co.

Orange County, Cal., 148 tons, undercrossing, to Consolidated Steel Co.

Kern County, Cal., 232 tons, undercrossing, to Virginia Bridge & Iron Co.

FABRICATED PLATES

AWARDS

Morgantown, W. Va., 920 tons, six coal barges for Tri-State Transportation Co., to American Bridge Co.

Tacoma, Wash., 525 tons, third unit of Green River pipe line, to American Concrete & Steel Pipe Co.

Casper, Wyo., 200 tons, pipe on Casper canal, to an unnamed bidder.

Long Beach, Cal., 1856 tons, riveted pipe, to Western Pipe & Steel Co.

Chelsea, Mass., 867 tons, six tanks for Pan-American Petroleum & Transportation Co., to Chicago Bridge & Iron Works.

Oshkosh, Wis., 323 tons, elevated tank, to Pittsburgh-Des Moines Steel Co.

Fort Lauderdale, Fla., 210 tons, elevated tank, to Tippett & Wood Co.

NEW PROJECTS

Port Arthur, Tex., 500 tons, caisson, Union Bridge & Construction Co., Kansas City, Mo., low bidder on general contract.

Newport, R. I., 500 tons, ferry boat for United States Naval Station; bids Jan. 3.

SHEET PILING

AWARDS

Bremerton, Wash., 180 tons, for navy yard, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 510 tons, Henry Hudson Parkway bridge approach.

Oneida, N. Y., 300 tons, city hospital building.

Carneys Point, N. J., 1800 tons, manufacturing plant for Du Pont Co.

THE SOUTH

Nashville, Tenn., 2000 tons, City Hall and court house.

Louisville, Ky., 700 tons, overpass; Henry Bickel Co., Louisville; low bidder on general contract.

State of Oklahoma, 750 tons, 14 highway bridges; bids Dec. 30.

Okmulgee, Okla., 900 tons, bridge.

Liano, Tex., 775 tons, bridge.

Oklahoma City, Okla., 675 tons, bridge.

CENTRAL STATES

State of Michigan, 1200 tons, six highway bridges.

Chicago, 1050 tons, Cermak Road viaduct; American Bridge Co., low bidder.

Chicago, Rock Island & Pacific Railroad, 290 tons, bridge at Manhattan, Kan.

State of Illinois, 700 tons, highway bridges.

Canton, Ohio, 200 tons, building for Timken Roller Bearing Co.

WESTERN STATES

Terminas, Cal., 300 tons, State bridge over Potato Slough; bids Jan. 8.

Los Angeles, 210 tons, tunnel ribs for Metropolitan Water District, Commercial Shearing & Stamping Co., low bidder.

Pierce County, Wash., 297 tons, State overhead crossing; bids opened.

Nisqually, Wash., 325 tons, State highway bridge.

Felton, Cal., 500 tons, bridge.

Ambrose Swasey Is Honored at Luncheon

TO honor Ambrose Swasey, chairman of the board, and one of the founders of the Warner & Swasey Co., Cleveland, on the occasion of his eighty-ninth birthday, more than 100 guests gathered at luncheon at the plant of the company, Dec. 19. Presidents of some of the country's leading manufacturers of machine tools and other men prominent in scientific and business activities joined with many of Mr. Swasey's fellow townsmen in paying him tribute.

The esteem in which Mr. Swasey is held was expressed and his scientific accomplishments and philanthropic activities were extolled by Dr. Winfred G. Leutner, president of Western Reserve University, speaking in behalf of all the guests. Mr. Swasey feelingly replied with words showing deep appreciation of the tribute paid him.

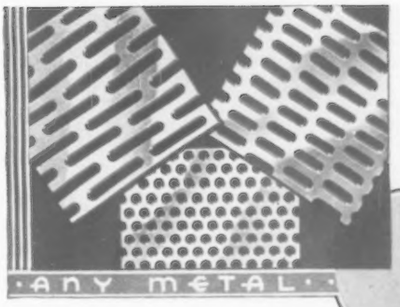
Following the luncheon the guests witnessed the polishing of the 82-in. mirror of the telescope which the Warner & Swasey Co. has built for the McDonald Observatory on Mount Locke, in western Texas, the second largest telescope in the world. The mirror is 13 in. thick and weighs nearly three tons. The visitors also witnessed the operation of the telescope under its own power, under direction of E. P. Burrell, the company's director of engineering, and designer of the telescope.

Mr. Swasey, who with the late W. R. Warner founded the Warner & Swasey Co., is a member of many scientific societies both here and abroad and has been decorated by several governments.

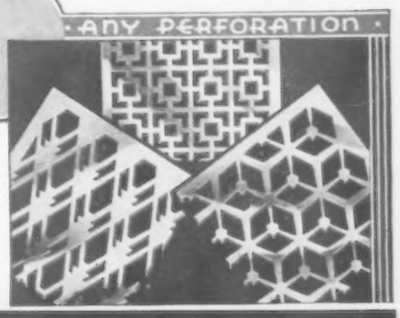
President Orders Interment of NRA

WASHINGTON, Dec. 23.—Effective Jan. 1, President Roosevelt today issued an executive order bringing an end to the National Recovery Administration. The division of review, division of business cooperation and advisory council were transferred to the Department of Commerce. The consumers' division was transferred to the Department of Labor.

The Secretary of Commerce was authorized to direct the functions of the divisions transferred to his department until April 1, 1936, when the recovery act expires. The consumers' council, to be directed by the Secretary of Labor, will continue under an emergency appropriation until June 30, 1937. The organization of Major George L. Berry, coordinator for industrial cooperation, while operating under NIRA funds, is not to be affected by the order.



INDUSTRIAL AND ORNAMENTAL SCREENS



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Railroad Equipment

American Car & Foundry Motors Co., subsidiary of American Car & Foundry Co., has received following orders for a. c. f. motor coaches: 10 H-12-S coaches from Chicago & Calumet District Transit Co.; two H-17-S from Triple Cities Traction Co.; four H-12 from Staten Island Coach Co.; two H-15 and one H-13 from Interstate Street Railways, Attleboro, Mass.; four H-9-S from Boston Elevated Railways, Boston.

United States Sugar Corpn. has placed order with Magor Car Corpn. for 10 30-ton cane cars.

Tata Iron & Steel Co., India, has ordered three 50-ton ore cars from Magor Car Corpn.

RAILS AND TRACK SUPPLIES

National of Mexico, through its foreign representative, International Railway Supply Co., New York, has placed two orders for Coffin feed water heater systems, aggregating 39 equipments, with J. S. Coffin, Jr., Co., Englewood, N. J.

Delaware, Lackawanna & Western Railroad, 140 Cedar Street, New York, C. C. Hubbell, general purchasing agent, asks bids until Dec. 30 for axles for freight cars, rough turned on journals and wheel seats only, for period from Jan. 1 to June 30, 1936.

Wabash has ordered 10,000 tons of rails from Bethlehem Steel Co., Carnegie Illinois Steel Corpn. and Inland Steel Co.

New York Central has filed application with the Interstate Commerce Commission for approval to purchase 35,000 tons of rails and accessories.

New Item Extras on Flat-Rolled Products

Mills producing flat-rolled products have notified their customers concerning new item extras which will be applied on all future business. These extras are applicable to all coated and uncoated sheet mill products except electrical sheets and formed roofing. In other words, these item extras will apply to the following finishes: hot-rolled and hot-rolled annealed sheets and products based thereon; cold-rolled and vitrenamel sheets; long ternes and roofing long ternes; galvanized flat sheets (not formed roofing); and galvannealed and allied products. The new item extras are as follows:

	Standard Sizes: Hot-rolled, hot-rolled annealed and products based thereon. Flat galvanized, galvannealed and roofing long ternes	Odd Sizes: All sheet products other than electrical grades and formed roofing
Items of 4000 lb. or more	No extra	No extra
Under 4000 lb. to 2500 lb.	No extra	25c. per 100 lb.
Under 2500 lb. to 1500 lb.	No extra	35c. per 100 lb.
Under 1500 lb. to 1000 lb.	10c. per 100 lb.	50c. per 100 lb.
Under 1000 lb. to 500 lb.	35c. per 100 lb.	75c. per 100 lb.
Under 500	75c. per 100 lb.	$1.00 per 100 lb.

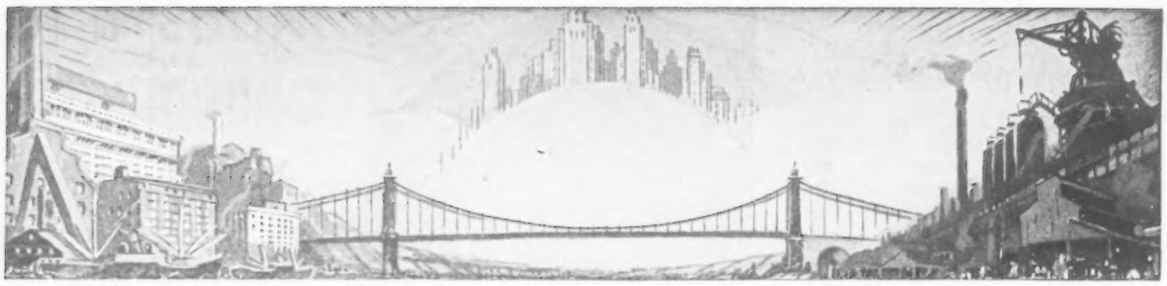
The above odd-size extras are applicable, irrespective of size, to cold-rolled, vitrenamel and long ternes because there are no standard sizes set up on these products. In addition to the above item the extras, the odd-size extra for exact quantity will remain in effect in all cases, as well as the quantity extras for less than carload orders.

Bethlehem Absorbs Subsidiaries

ALL business heretofore conducted by three Bethlehem Steel Corpn. subsidiaries, McClintic Marshall Corpn., Pacific Coast Steel Corpn. and Kalman Steel Corpn., will be conducted by Bethlehem Steel Co., effective Jan. 1, according to an announcement by E. G. Grace, president, Bethlehem Steel Corpn.

The fabrication and erection work of Bethlehem was formerly handled under the McClintic Marshall name, the West Coast business has been conducted in the name of Pacific Coast Steel Corpn., and Kalman has handled reinforcing bars, steel sheet piling and certain light steel products for building and road construction.

This action is taken for the purpose of simplifying the corporate structure and expediting the conduct of the business.



Plant Expansion and Equipment Buying

Preliminary Automotive Activity Features Holiday Machine Tool Market

DESPITE the usual holiday lull in activity, the 1936 plans of the automotive industry have begun to give the machine tool industry an optimistic tone. The Fisher Body Corpn. has ordered three large presses for the manufacture of turret tops at its new Grand Rapids, Mich., plant and is still in the market for a number of smaller presses. Some tool room equipment for this plant has been purchased, but much of it remains to be placed.

The Pontiac division of General Motors will close in the near future on machining equipment for its rear axle plant and other General Motors units are planning large expenditures early in the new year. Packard is not progressing very rapidly on its plans for a six-cylinder car, but will eventually require considerable equipment.

NORTH ATLANTIC

Continental Oil Co., 60 East Forty-second Street, New York, plans new bulk oil storage and distributing plant on 12-acre tract on Calcasieu River, near Lake Charles, La., recently acquired, to include 500-ft. dock with loading and unloading equipment, and steel tanks with capacity of 90,000 bbl. Cost over $150,000 with equipment. Company is also considering new gasoline refinery in oil field district at Tepetate, La., with storage and distribution facilities.

American Steel Wool Mfg. Co., 13 Desbrosses Street, New York, has leased about 40,000 sq. ft. floor space in building at Jackson Avenue, near Bridge Plaza, Long Island City, for new plant.

Continental Can Co., 1 Pershing Square, New York, has let general contract to Austin Co., Cleveland, for one-story addition to branch plant at South Warwood, Wheeling, W. Va. Cost about $50,000 with equipment.

Union School District, Riverhead, L. I., plans manual training department in new three story junior-senior high school, for which financing in amount of $644,775 has been authorized, part of fund to be secured through Federal aid. Superstructure will begin early in January.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Jan. 14 for electric storage batteries (Circular 105).

Johns-Mansville Corpn., 22 East Fortieth Street, New York, has acquired 60 acre tract in Jefferson Parish, near New Orleans, for new branch plant. Initial unit will be one-story, 150 x 800 ft., with power house, machine shop and other mechanical structures, on which work will begin early next year. A branch mill at Gretna, La., will be removed to new location later. Cost about $700,000 with machinery. S. A. Williams is vice-president in charge of mines and plants.

Prussin Chemical Co., Long Island City, New York, recently organized, has leased about 12,000 sq. ft. floor space in building at 45-36 Vernon Boulevard, for manufacture of industrial chemical products.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 3 for magnet wire (Schedule 6806), 900 storage battery testing outfits (Schedule 6818), 1200 oil-burning lanterns, 60 oil-burning running lights, oil-burning signal lights, etc. (Schedule 6815), two motor-driven pipe-threading machines (Schedule 6761); until Jan. 7, 56 portable electric drills (Schedule 6816) for Brooklyn Navy Yard.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Jan. 3 for one complete unit for milling 1000 mechanical time fuzes per 8-hr. day, and for milling wrench slots, pin slots, stop pins, etc. (Circular 199); until Dec. 30 for one generating unit complete (Circular 265).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 3 for 700,000 ft. steel aircraft cable (Schedule 6777), 143,400 machine bolts and nuts (Schedule 6792), 15,000 50-ft. lengths pneumatic hose, 300 aircraft turn and bank indicators (Schedule 6760), 12 pneumatic grinders (Schedule 6824) for Philadelphia Navy Yard.

Artistic Wire Products Co., branch of Meriden Wire Form Co., Higganum, Conn., is now located in its new plant at 1233 West St. George Avenue, Linden, N. J. R. Planeta is head of company.

BUFFALO DISTRICT

Owen Dyneto Corpn., 301 Wolf Street, Syracuse, N. Y., manufacturer of automotive starting, lighting and generating equipment, a subsidiary of Electric Auto-Lite Co., Toledo, Ohio, plans extensions for manufacture of electric welding apparatus and parts, a new line of production. Part of required equipment will be removed from plant of US Battery Corpn., Niagara Falls, N. Y., an affiliated interest. Proposed to have new division ready for operation early in 1936, with facilities for employment of about 100 persons. Harry L. Bill is vice-president and general manager of first noted company.

Oldbury Electro Chemical Co., Buffalo Avenue, Niagara Falls, N. Y., manufacturer of industrial chemicals, has let general contract to Wright & Kremers, Inc., Pine Avenue and Main Street, for one-story addition, 62 x 85 ft. Cost about $40,000 with equipment.

Corning Glass Works, Corning, N. Y., has plans for one-story addition for manufacture of fibrous glass products, with facilities for employment of about 150 men in new unit. Cost close to $100,000 with equipment.

NEW ENGLAND

United-Carr Fastener Corpn., 31 Ames Street, Cambridge, Mass., manufacturer of metal stampings, screw machine products, metal snap fasteners, etc., has let general contract to Temple & Crane, Inc., 80 Federal Street, Boston, for one-story addition, 50 x 100 ft. Cost close to $40,000 with equipment.

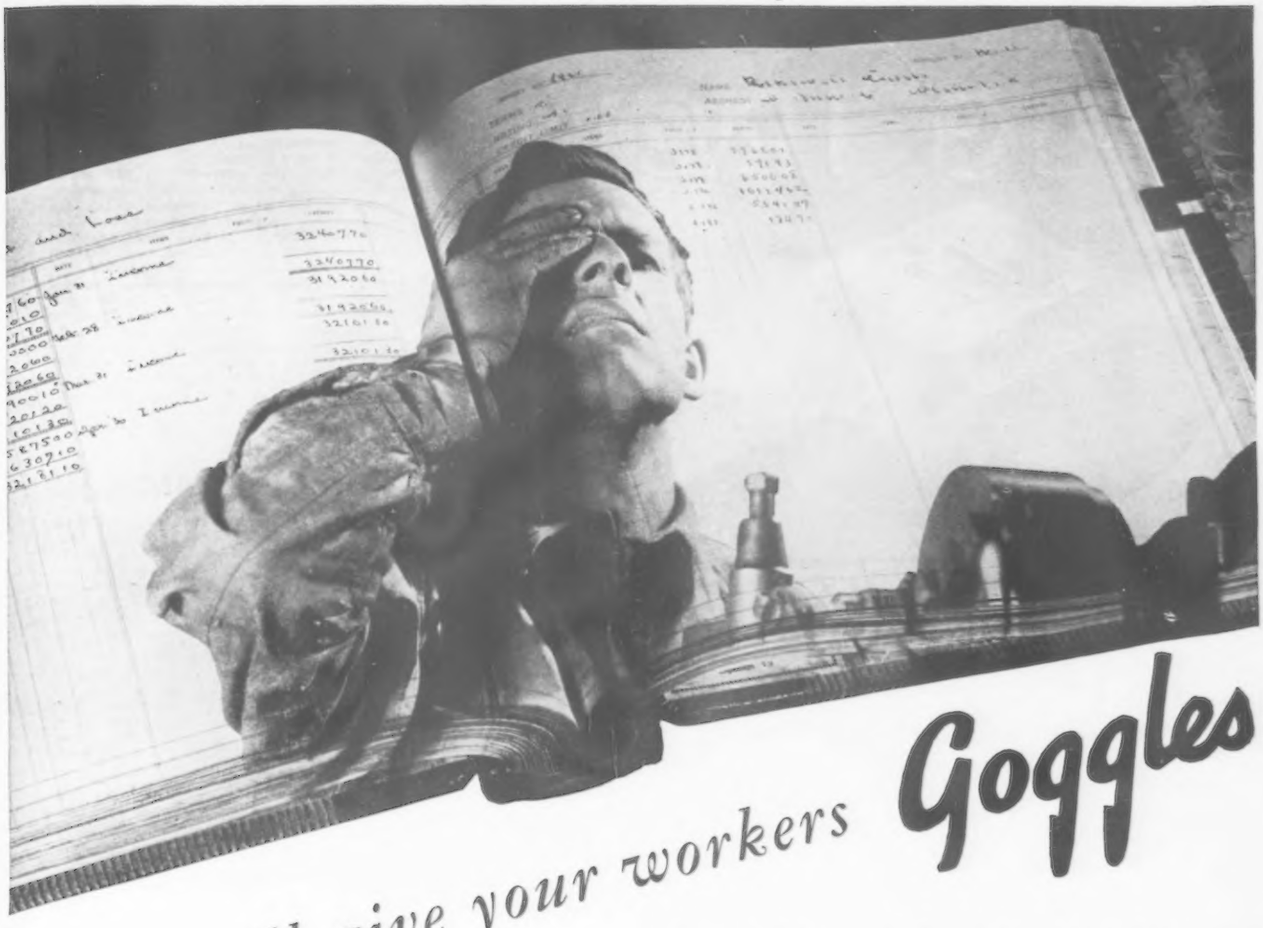
Narragansett Brewing Co., Arlington Street, Providence, R. I., has let general contract to Bowerman Brothers, Inc., 70 Bath Street, for one-story addition. Cost about $35,000 with equipment.

Commanding Officer, Springfield Armory, Springfield, Mass., asks bids until Jan. 3 for one milling machine and one cutting arbor (Circular 84).

Hinsdale Paper Mfg. Co., Hinsdale, N. H., has engaged McClintock & Craig, 458 Bridge Street, Springfield, Mass., consulting engineers, to prepare plans for rebuilding part of mill recently destroyed by fire, with loss over $200,000 including equipment. Louis N. Stearns is treasurer and general manager.

Holyoke Water Power Co., 1 Canal Street, Holyoke, Mass., has approved plans for addition to steam generating plant, including new equipment. Cost over $175,-

COUNT THE COST of Eye Accidents . . .



and you'll give your workers Goggles

WHAT a worker's eye is worth to him —*only he can say.* But if he loses it *it may cost $2,000 in compensation.* Two thousand dollars in direct compensation alone—the price of a new piece of production equipment—the price of a good worker's services for a year.

Even minor eye injuries are expensive. One company counted up the cost, found eye-cases averaged $225 apiece. *And for men in the metal-working industries there are 26 eye accidents per 1000 men per year.*

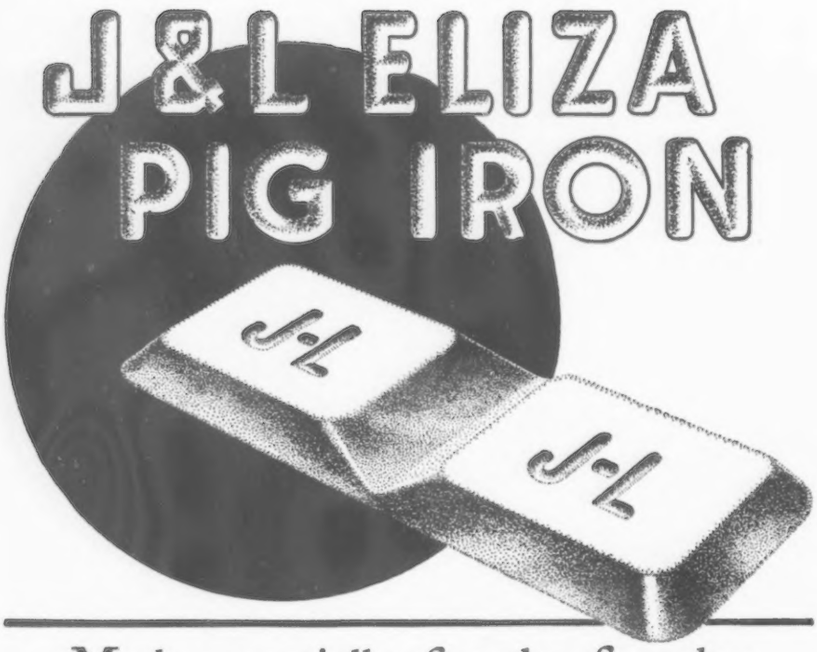
Dig into your eye-accident cost records. Then ask the American Optical Company industrial representative stationed near you for an estimate of the cost of efficient eye protection. In the complete American Optical Company line there is a goggle for every eye-hazardous job . . . a goggle that men can wear in complete comfort . . . a strong goggle that will save their eyes.

One sightless eye costs more than goggles for 1000 men. Write or call our nearest office today.

This new book will help you count the cost of eye-injuries—show how others have stopped eye-injuries—help you figure your profits on eye-protection. Write for it.

American Optical Company

Manufacturers, for more than 100 years, of products to aid and preserve vision. Factories at Southbridge, Mass. In Canada, Consolidated Optical Co., Ltd. Branch offices in all principal industrial centers



Made especially for the foundry and malleable trade . . . no scrap

JONES & LAUGHLIN STEEL CORPORATION
AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

J&L STEEL

000. Arthur L. Nelson Engineers, Inc., 31 St. James Avenue, Boston, is consulting engineer.

School Board, Guilford, Conn., plans manual training department in new two-story high school, for which bids have been asked on general contract. Cost about $175,000. G. Archer Quirk, New Haven, Conn., is architect; Schilling & Goldbecker, Inc., New Haven, is associate architect.

SOUTHWEST

Carondelet Brewing Co., 2025 Gravois Avenue, St. Louis, has acquired former plant of Phoenix Brewery Co., 217 South Eighteenth Street, idle for several years, and will remodel for new brewery. Cost close to $165,000 with equipment.

Common Council, Shelbina, Mo., asks bids until Jan. 6 for one heavy-duty Diesel engine and accessories, and auxiliary equipment for municipal electric light and power plant. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Superior Roller Co., 1821 Central Street, Kansas City, Mo., manufacturer of printers' rollers and other printing equipment, plans rebuilding part of plant recently destroyed by fire. Loss about $25,000 with equipment.

Purchasing and Contracting Officer, Field Artillery School, Fort Sill, Okla., asks bids until Jan. 9 for one motor-driven wood-working machine (Circular 51).

Canadian Mill & Elevator Co., El Reno, Okla., will soon take bids for new six-story and basement mill and elevator, 36 x 100 ft., with elevating, conveying, screening and other mechanical equipment. Cost over $125,000. Unit will replace a structure destroyed by fire several months ago. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers. Herman K. Schafer is president.

Golden Gate Wine Co., Atlanta, Ga., has leased property at 1107 Wood Street, Houston, Tex., for new branch mechanical bottling works. Cost close to $55,000 with machinery.

Board of Education, St. Louis, will open bids Jan. 8 for equipment for shops in Blewett junior high school, to cost about $20,000.

WASHINGTON DIST.

Crown Cork & Seal Co., Inc., Eastern Avenue and Kresson Street, Baltimore, has let general contract to Consolidated Engineering Co., 20 East Franklin Street, for one-story addition, 53 x 80 ft. Cost about $30,000 with equipment.

Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Jan. 15 for machine tools and hand tools, 185 units (Circular 80).

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for combined land plane and sea plane hangar, with reconditioning and repair facilities; electric power plant and electrical distributing system; fresh and salt water supply systems, with pumping machinery and auxiliary equipment, pipe lines, etc.; gasoline storage system and other miscellaneous work for aviation facilities at St. Thomas, Virgin Islands (Specification 8127).

Celanese Corpn. of America, Inc., Amcelle, near Cumberland, Md., manufacturer of cellulose rayon products, has let general contract to George F. Hazelwood, Cumberland, for one-story addition. Cost about $80,000 with equipment. Headquarters are at 180 Madison Avenue, New York.

Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until Jan. 13 for copper angle tubes in lots of 5000 to 12,500 (Circular 26).

Bureau of Supplies and Accounts, Navy Department, Washington, will ask bids until Jan. 3 for 1500 cylinder valves (Schedule 6830) for Norfolk, Va., Navy Yard; centrifugal cast bearing bronze liners (Schedule 6784), one motor-driven hydraulic press (Schedule 6779) for Washington yard; one motor-driven bar shear, guillotine-type (Schedule 6796), one motor-driven engine lathe (Schedule 6814) for Boston yard; steel and composition valves (Schedule 6758), aluminum alloy gratings (Schedule 6767) for Eastern and Western yards; three electrical test benches for testing magnetos, generators, condensers, starters, etc., for Sewall's Point, San Diego and Kansas City, Kan., stations (Schedule 6787); until Jan. 7, five 1200-lb. platform weighing scales, 18 general purpose weighing scales, 12 240-lb. counter scales, and 11 10-lb. bakers' trip scales for Sewall's Point, Mare Island and Eastern yards (Schedule 6810).

SOUTH ATLANTIC

Canada Dry Ginger Ale, Inc., 122 East Forty-second Street, New York, has purchased property at Miami, Fla., as site for new one-story factory branch and mechanical bottling works. Temporary offices at Miami have been established at 3841 N. E. Second Avenue; Kingman Moore will be in charge of construction. Cost over $60,000 with equipment.

City Council, Bartow, Fla., C. S. James, city manager, plans early call for bids for Diesel engine-generating equipment for municipal electric light and power plant, including extensions in transmission lines. Bids recently received have been rejected.

Florida Dolomite Co., care of John L. Early, Sarasota, Fla., recently organized, plans mineral mining and processing plant on dolomite properties about two miles from city, comprising two or more one-story units with crushing, grinding, conveying, loading and other mechanical equipment. Cost over $40,000 with machinery. S. D. Gooch is engineer.

Common Council, Fletcher, N. C., plans new municipal airport, including hangar with repair and reconditioning facilities, mechanical shop and other structures. Fund of $100,000 has been secured through Federal aid.

MIDDLE WEST

Sherwin-Williams Co., East 115th Street and South Cottage Grove Avenue, Chicago, manufacturer of paints, varnishes, oils, etc., plans additions and improvements to plant in Kensington district. Cost about $850,000 with equipment. Company headquarters are at Cleveland.

Monk Brewery Co., 4539-41 Armitage Avenue, Chicago, has let general contract to Stubenball Concrete & Construction Co., 4833 Montana Avenue, for new two-story brewery unit, 40 x 87 ft. Cost about $40,000 with equipment.

United States Engineer Office, Port Peck, Mont., asks bids until Jan. 3 for two cranes, on standard commercial Diesel-operated crawler-type tractor (Circular 230).

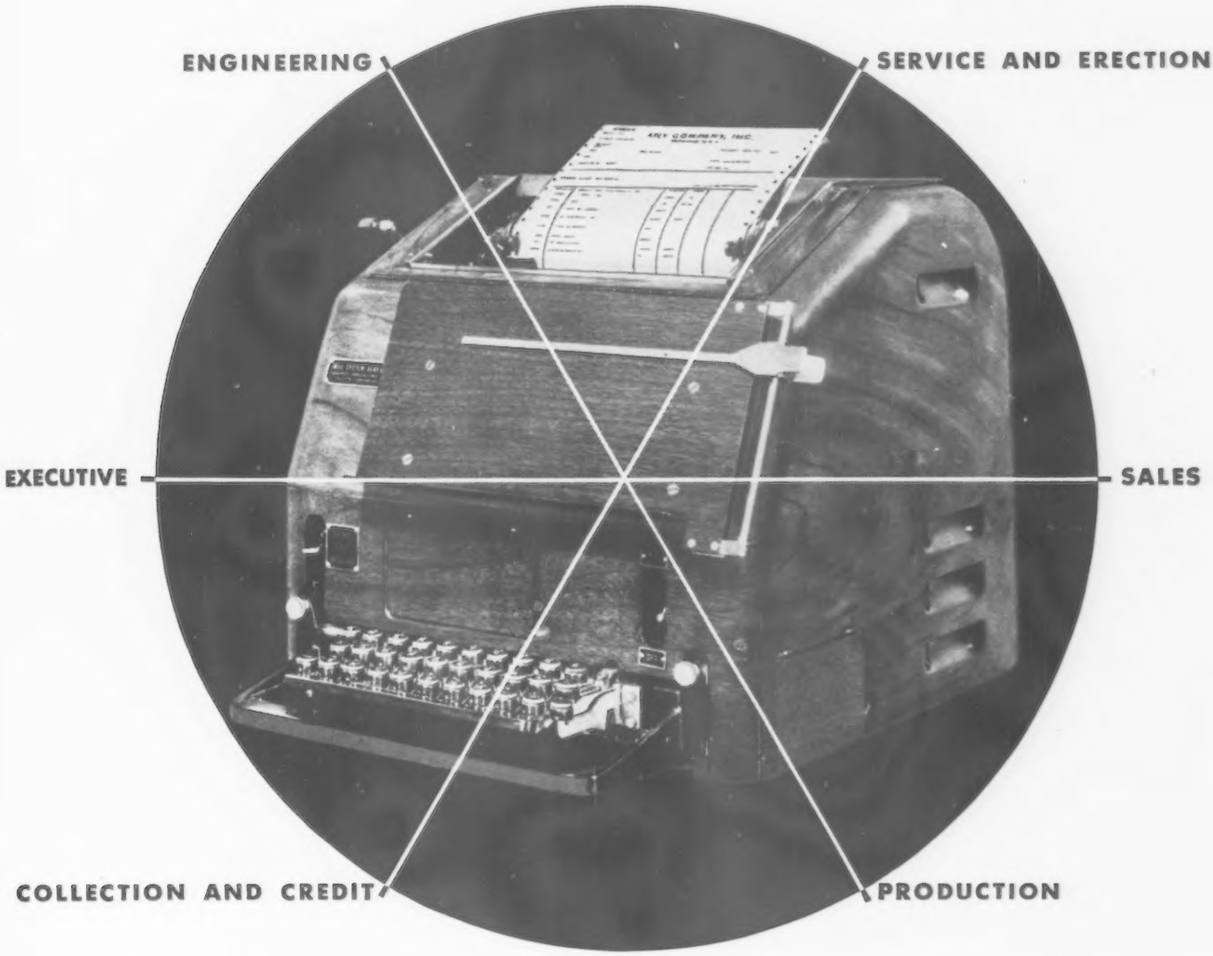
John Deere Tractor Co., Waterloo, Iowa, manufacturer of agricultural equipment, has plans for one-story addition, 60 x 120 ft., primarily for storage and distribution. Cost close to $30,000 with equipment.

Chicago & North Western Railroad Co., 226 West Jackson Boulevard, Chicago, has let general contract to G. A. Johnson & Sons, 730 Rush Street, for new engine house, with shop facilities, at Boone, Iowa. Cost about $35,000 with equipment.

Agricultural Power-Alcohol Corpn., Omaha, Neb., care of Bert LeBron, LeBron Electric Works, city, recently organized by Mr. LeBron and associates, has acquired former distillery of Iler Distilling Co., Fourth and Pierce Streets, on tract 200 x

EVERY DEPARTMENT

of Combustion Engineering Company, Inc., depends upon Bell System Teletypewriter Service

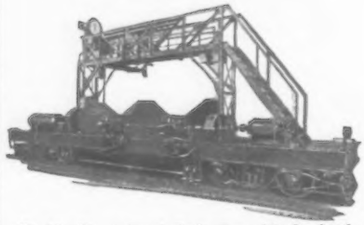


THE Combustion Engineering Co., Inc., makes, sells and installs boilers, stokers, and allied equipment. Headquarters are in New York, and two of the principal manufacturing plants are at St. Louis and Chattanooga. Bell System Teletypewriter Exchange Service connects the three points.

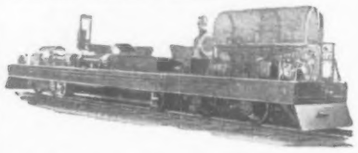
Estimates, production schedules, shipping instructions, etc., typed once in New York, are *instantly, accurately* reproduced at either of the plants. Questions can be asked and answered on the same connection. This fast, two-way transmission is especially valuable in a business where most jobs are done to exact specifications, with price and time as important competitive factors.

Besides inter-office traffic, St. Louis and Chattanooga teletype orders direct to the steel mills—which means better delivery dates—and permits steel to be cut to size at a considerable net saving in scrap and low inventory. Virtually every department of the Combustion business makes efficient, economical use of teletypewriter service. Probably you'd find this modern service equally valuable in your own business.

ATLAS CARS



Double Compartment Scale Car with Overhead Operator's Platform. Car provided with Orr Bin Gate Operating Mechanism.



20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

Atlas Products

Gas-Electric and Diesel-Electric Locomotives

Electric Transfer Cars for Blast Furnaces and Steel Plants

Stockhouse Scale Cars for Blast Furnaces

Concentrate and Calcine Cars for Copper Refineries

Automatic and Remote Controlled Electric Cars

Pushers, Levellers and Door Extractors

Coal Charging Lorries, Coke Guides and Clay Carriers

Atlas Patented Coke Quenching Cars for By-Product Coke Ovens

Atlas Patented Indicating and Recording Scales

Special Cars and Electrically Operated Cars for every conceivable purpose.

THE ATLAS CAR & MFG. CO.

Engineers - Manufacturers

1140 Ivanhoe Rd., Cleveland, O

300 ft., and will remodel for manufacture of automotive fuels; additions will be built. Cost about $100,000 with boilers, stills, fermenters and other machinery.

Heil Co., 3000 West Montana Street, Milwaukee, manufacturer of motor truck bodies, steel tanks, oil burners, etc., is completing negotiations for acquisition of plant at Hillside, N. J., for manufacturing and assembly operations to serve Eastern trade.

Board of Education, Negaunee, Mich., M. G. Degabriele, secretary, closes bids Dec. 27 for additional story on vocational school and 24-room addition to grade school, project costing $240,000 and financed by PWA loan. Warren S. Holmes Co., 2100 Olds Tower, Lansing, Mich., is architect.

SOUTH CENTRAL

W. C. Nabors Co., Mansfield, La., manufacturer of motor trailers and parts, has acquired building at 206 South Pauline Street, Memphis, Tenn., for new factory branch, storage and distributing plant. Cost about 35,000 with equipment.

Southern Shellac Mfg. Co., 556 Suzelle Street, Memphis, Tenn., has plans for one-story addition, 98 x 125 ft., primarily for storage and distribution. Cost about $25,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Jan. 3 for conveying equipment for handling fine dried phosphate rock at Federal fertilizer works, Wilson Dam, Ala., including pneumatic conveyors, screw conveyors, conveyor piping, suction pumps, motors, gates, feeders, dust collectors and auxiliary equipment; also until Jan. 8 for 2300-volt switching equipment for Wheeler hydroelectric power plant.

Superior Oil Corpn., Tulsa, Okla., is considering new bulk oil storage and distributing plant at Louisville, where site has been selected. Cost over $35,000 with steel tanks and other equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Jan. 6 for one 75-hp. crawler-type tractor (Circular 156).

WESTERN PA. DIST.

United States Engineer Office, Pittsburgh, asks bids until Jan. 11 for two vertical tripled single-acting motor-driven pumping units, with auxiliary equipment, for Tygart River reservoir dam (Circular 161).

Wheeling Steel Corpn., Wheeling, W. Va., has approved plans for one-story branch storage and distributing plant on Webster Avenue, Memphis, Tenn., 328 x 350 ft., with installation of conveying, loading and other mechanical-handling equipment. Cost about $100,000.

OHIO AND INDIANA

Lubri-Zol Corpn., St. Clair Avenue, Wickliffe, Ohio, manufacturer of lubricating oils, compounds, etc., has asked bids on general contract for one-story addition, 66 x 100 ft. Cost close to $50,000 with equipment.

Tuscar Metals, Inc., Dover, Ohio, recently organized to manufacture stainless steel products, has acquired former local mill of American Sheet & Tin Plate Co. and will remodel for new works. Plant of Alloy Welding & Mfg. Co., 1115 Metropolitan Avenue, Pittsburgh, has been taken over by new organization and will be removed to Dover, with installation of additional equipment. Cost close to $50,000. New company will also occupy former plant of American Sheet & Tin Plate Co. at New Philadelphia, Ohio, later for similar line of output noted, including steel fabricating.

Contracting Officer, Material Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 30 for cable, wire, conduit, clamps, condulets, junction boxes, etc. (Circular 423); until Jan. 3, washers (Circular 411); until Jan. 6, aircraft and engine nuts (Circular 412); until Jan. 7, one spot-welded stainless steel wing (Circular 369), windshield side panels, top panels and retainer windshield panel (Circular 388); until Jan. 8, aircraft bolts, eye bolts, clevice bolts, check nuts, screws and cable shackles (Circular 418); until Jan. 9, shut-off primer cock assemblies and engine primer assemblies (Circular 425).

Lever Brothers Co., Hammond, Ind., manufacturer of soaps, washing powders, edible oils, etc., has plans for additions to local plant and refinery, including improvements in present units. Cost about $5,000,000 with equipment. Company headquarters are at 164 Broadway, Cambridge, Mass.

MICHIGAN DISTRICT

Eddy Marine Corpn., Bay City, Mich., recently organized, has taken over former local plant of Radio Master Co., about 170,000 sq. ft. floor space, for manufacture of motor-driven power boats, including production and assembling. Facilities will be provided for employment of about 200 men. George G. Eddy, Manistee, Mich., is president and general manager. T. P. Lyons, Manistee, is treasurer.

Nylen Products Co., 13712 Tyler Street, Detroit, manufacturer of engine pistons and piston rings, etc., has acquired former plant of Watts Laundry Machine Co., St. Joseph, Mich., for new works. Present plant will be removed to new location and capacity increased.

Federal Asphalt Products Co., 5620 Federal Avenue, Detroit, recently organized to manufacture asphalt roofing, waterproofing cements and kindred products, is erecting new one-story plant, location noted, to be ready for occupancy early in 1936. Cost over $65,000 with machinery. Nathan Fishman is president.

Century Refining Co., Alma, Mich., recently organized, care of A. F. Chase, Michigan Trust Building, Grand Rapids, Mich., representative, plans new oil refinery at first noted place, with storage and distributing facilities. Company is capitalized at $400,000.

PACIFIC COAST

Pacific Can Co., South Williams Street, near West Newhall Street, San Francisco, has plans for one-story addition, 40 x 150 ft., and will carry out construction with day labor. Cost about $30,000 with equipment. Ellison & Russell, Pacific Building, are engineers.

Paramount Productions, Inc., 5451 Marathon Street, Los Angeles, producer of motion pictures, has plans for new one-story machine shop at studio, 44 x 64 ft. Cost about $27,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 3 for 24 chain hoists (Schedule 6781), operated whistles and spare diaphragms (Schedule 6770), 60 motor-operated sirens (Schedule 6782) for Mare Island and Portsmouth navy yards; gate valves (Schedule 6743) for Mare Island yard; two motor-driven watchmakers' lathes and spare parts (Schedule 6776); until Jan. 7, one motor-driven drill press (Schedule 6790), one motor-driven metal-cutting hacksaw (Schedule 6797), one foundry core-making machine, hand-driven, for bench mountings (Schedule 6789), one forming machine and one sheet metal-working machine (Schedule 6791) for San Diego yard; nine pneumatic hoists, 4000-lb. capacity (Schedule 6801) for Puget Sound yard.

Board of Education, 1151 South Broadway, Los Angeles, has engaged Arthur R. Hutchason, Architects' Building, architect, and C. A. Sanborn & Co., 357 South Hill Street, mechanical engineers, to prepare plans for new one story vocational training shop at Joseph Le Conte junior high school, North Bronson Avenue. Cost about $30,000 with equipment.

Horluck Brewing Co., Westlake Avenue North and Mercer Street, Seattle, has authorized plans for addition to brewery, including stockhouse extensions. Cost about $35,000 with equipment. McClelland & Jones, Republic Building, are architects.

FROM AN IRON CASTING TO Union Cold Drawn Steel AT A SAVING OF 63%

COLD DRAWING PROVIDES MAXIMUM MACHINABILITY

VIGILANT LABORATORY CONTROL

● Reduced material cost, reduced machining cost, less expensive inventories and greater strength were the results of replacing iron castings with Union Cold Drawn Steel for the making of this shaft coupling.

When made from a casting, machining was required over all the surface of the outside diameter. By using cold drawn bars, the operations for producing a smooth, bright surface, accuracy to close tolerance and uniform cross section were eliminated.

Machining cost, exclusive of set screw requirements, dropped from 12¢ to 2½¢ — a saving of 9½¢ per part. Material cost dropped from 37¢ to 15½¢ each — a saving of 21½¢. Total savings, 31¢ on an original cost of 49¢.

Being machined right from the bars, parts are now made as needed without requiring a stock of unfinished pieces. Being stronger than iron, cold drawn steel improved the quality of the coupling.

These striking facts suggest many profitable uses for cold drawn steel in place of forgings, castings or hot rolled stock, particularly where these stocks require surface machining. Watch your material cost, your machining cost and your inventory cost with an eye to what Union Cold Drawn Carbon and Alloy Steels can do to reduce them.

UNION DRAWN STEEL CO. MASSILLON, OHIO

SUBSIDIARY OF
REPUBLIC STEEL CORPORATION

Study these features of

UNION COLD DRAWN FLATS AND SQUARES

• These features of Union Cold Drawn Rectangles, important to hundreds of applications, are distinct qualities which no finishing process can produce so economically as cold drawing. These bars are stronger than steel in other forms and can be machined at lower cost. They are cold drawn within standard manufacturing tolerances.

Important economies are found by using these bars ground on one or more sides ready for nickel or chrome plating. They eliminate costly grinding operations at your plant.

Don't overlook uses for flats of extra width up to 12 inches. You can apply them in multiples to form flat surfaces of any area and do away with machining operations on castings to obtain that feature.

Because of their extensive size range, no cold drawn bar shapes find more varied uses than squares and flats. Large stocks are carried at distributors' warehouses. For your frequent needs, be sure you get Union Cold Drawn Bars with all their advantages.

UNION DRAWN STEEL CO. **MASSILLON, OHIO**

SUBSIDIARY OF
REPUBLIC STEEL CORPORATION

Among their Many Uses

Machine racks
Machine keys
Machine structural parts
Screw driver stock
Printers' chases
Chain side links
Elevator door closers
Jigs and dies
Fixtures
Bolts and nuts
Door handle stems
Crankshaft counterweights
Vault door grilles
Safety deposit boxes

FOR PARTS OF

Automobiles
Business machines
Voting machines
Package machines
Printing presses
Textile machines
Cigarette making machinery

EXTRA WIDE FLATS

Bed plates
Die backing
Stripper plates
Pattern plates
Pin plates

Union Cold Drawn Steels

COLD · DRAWING · PROVIDES · MAXIMUM · MACHINABILITY

Sinbad's Burden

. . . Yielding to the pleadings of the Old Man of the Sea, Sinbad lifted him onto his shoulders and carried him tenderly across the stream. To his amazement, the Old Man refused to alight. Instead, he entwined his legs so tightly around Sinbad's chest that he could not be shaken off. Day after day Sinbad's burden became more and more crushing. . . .

A MATERIAL, process or modus operandi will sometimes so firmly imbed itself in the construction of an implement, appliance, engine, machine, vehicle, or part, that discarding it in favor of something more modern is often difficult. Meantime, its continued use may become a serious burden to both production and sales departments. . . . For competition is ever ready to capitalize a rival's lack of progressiveness.

Is the persistent retention of once modern steels threatening to leave your company behind in the face of the newer discoveries of metallurgists and steel-makers? Have you brought yourself up to date on the latest progress of Molybdenum — the alloy which not only improves ordinary carbon steel, but actually increases the effectiveness of other alloys?

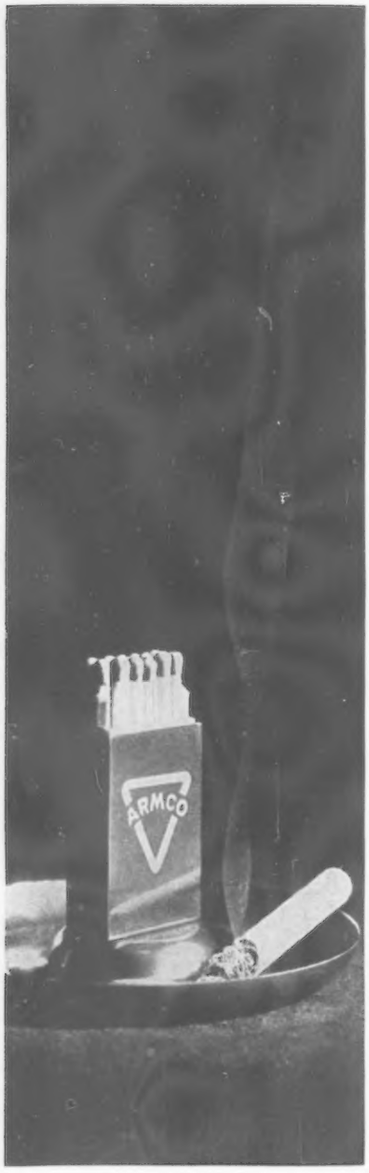
Greater strength, toughness and shock resistance, less temper embrittlement, easier machinability and welding — these are some of the qualities "Moly" imparts to steel and iron. Yet so powerful is Moly, and so little is the quantity required, that it seldom adds to — and generally reduces — the ultimate cost . . . because it usually lowers the first cost in alloy content, means fewer rejects and effects other shop economies.

Investigate Moly. Moly has had more than a decade of countless laboratory, steel-furnace, foundry, forge and punishing service tests. We invite engineers, metallurgists, production and business executives to write for either or both of these interesting books: "Molybdenum in 1934" and "Molybdenum in Cast Iron — 1934 Supplement." Also ask us to mail you our periodical news-sheet, "The Moly Matrix." Be free, too, to enlist the aid of our Detroit experimental laboratory. Climax Molybdenum Company, 500 Fifth Avenue, New York.

MOLY

CLIMAX Mo-lyb-den-um

INDUSTRY'S MOST MODERN AND VERSATILE ALLOY



★

ONE DAY

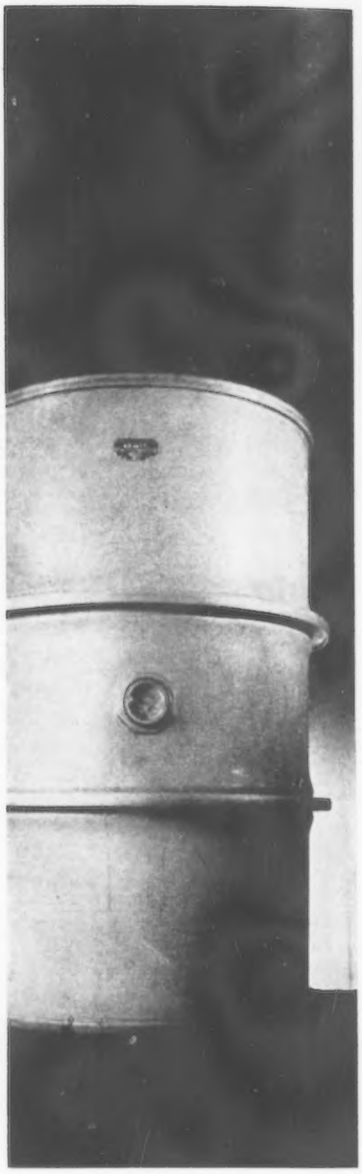
AN

ASH TRAY

THE NEXT

A

GIANT DRUM



Small, decorative and pleasure-bent, or big, sturdy and corrosion-resistant — it makes no difference to ARMCO STAINLESS STEELS.

Here are sheets, plates and strip that take their work in stride—that fabricate readily and are really a credit to you when the job is done.

Naturally, ARMCO STAINLESS STEELS repel most of the acids and corrosives encountered in modern industry. Naturally, too, they are easy to clean and keep clean, absolutely non-contaminating. They withstand oxidation at exceptionally high temperatures, and retain their tremendous strength. But the thing they do best is last long and keep down replacement costs.

Whatever your requirements for stainless steels, there is an ARMCO type and finish that will do just what you want it to do, easily, economically and profitably. Our complete metallurgical facilities are at your disposal. Just write and suggest how you want us to help. The American Rolling Mill Company, Executive Offices: Middletown, Ohio.

OTHER ARMCO PRODUCTS

COLD-ROLLED SHEETS • HOT-ROLLED AND ANNEALED SHEETS ALLOY COATED SHEETS • STAINLESS STEEL SHEETS • ELECTRICAL SHEET STEEL • ROOFING AND SIDING SHEETS • ENAMELING IRON SHEETS • GALVANIZED SHEETS COLD-ROLLED STRIP • PLATES HOT-ROLLED SHEETS • LONG TERNES • HOT-ROLLED STRIP AND TIN MILL BLACK PLATE.

BEHIND THE ARMCO TRIANGLE TRADEMARK *is a wealth of experience in the manufacture of special analyses iron and steel sheets and plates. Make it yours.*

ARMCO

STAINLESS STEELS

THERE IS A DIFFERENCE

TOOLS look a good deal alike at the start—but long hours of production work soon demonstrate what a difference there is.

Results show the value of careful steel selection, thoroughly mastered heat treating procedure, rigid adherence to accuracy standards. These are the reasons why Morse Tools are different. They work longer and faster between sharpenings. They bring your production costs down where they belong.

MORSE

TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASS., U.S.A.

New York Store, 92 Lafayette Street

Chicago Store, 570 West Randolph Street

The Morse Line includes High Speed and Carbon

- DRILLS
- REAMERS
- CUTTERS
- TAPS AND DIES
- SCREW PLATES
- ARBORS
- CHUCKS
- COUNTERBORES
- MANDRELS
- TAPER PINS
- SOCKETS
- SLEEVES

. . . OF PRECISION MANUFACTURING

THE tradition is more than a century old. It began with scales and persists today in every branch of the huge and far-flung Fairbanks-Morse engineering and manufacturing organization.

From the sensitive chemist's balance to a mighty Diesel—from a government's standard weight to a gigantic pump for a city's water supply—PRECISION is the tradition, the aim and the attainment of an entire organization which will not tolerate approximations.

105 years of knowing how . . . 105 years of fidelity to the idea that there is *no* substitute for precision—these are built into every product bearing the F-M seal.

For motors, Diesel engines, pumps and scales that will give more in dependability and low cost performance than the specification sheets alone can show, your investigation should include equipment bearing the "F-M" seal—our symbol of precision in manufacture.

FAIRBANKS, MORSE & CO.

MANUFACTURERS • CHICAGO, ILLINOIS

GIANTS OF TRANSPORTATION

Today's ocean liners demonstrate both the economy and the necessity of transporting many more passengers and much more *freight* than ever before, at each trip. • Management in industry must apply the same principle to its own load-transportation. With costs climbing steadily, the needless picking up and putting down of plant and warehouse loads *is a profit-killing waste that must be stopped.*

• • •

Whatever your product or your volume, you need and must have the most modern methods of transporting your materials *safely;* in greatest *quantity;* for the longest *distance;* in the least *time* and *at the lowest cost.*

Elwell-Parker builds Power Industrial Trucks in so *complete* a line that your own need for lowest-cost handling can be met exactly, through the right type and size of Power Truck, Tractor or Crane.

The best Elwell-Parker for *your* work will be chosen because of its ability to handle record loads with speed and safety, and to reduce costs so sharply as to pay for itself within a year—or even a few months.

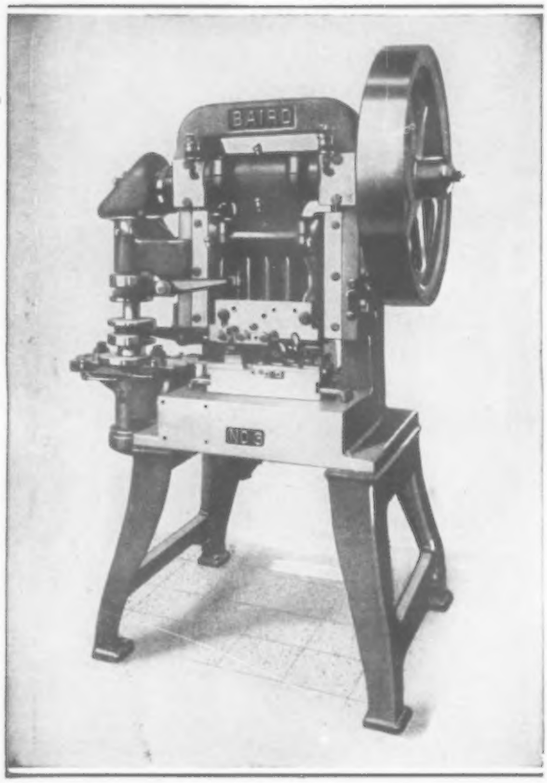
Don't trifle with this vital subject of your load-transporting costs; don't guess, when you can *know.* Ask us to send an Elwell-Parker Engineer to study your plant and help you plan the correct System for your special needs. There will be no obligation; you will undoubtedly gain many new, valuable ideas.

Executives should read "This New Industrial Pick-up." Free, if requested on your business stationery. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

Members of a fleet of Elwell-Parker Trucks serving S. S. "Normandie" at the French Line docks, New York.

New ELWELL·PARKER Trucks

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906



SOMETHING NEW!

AUTOMATIC MACHINERY BAIRD BRIDGEPORT CONNECTICUT U.S.A.

AUTOMATIC MULTIPLE TRANSFER PRESSES

The latest of the many Baird achievements is the Automatic Multiple Transfer Press for the automatic production of stampings from ribbon metal requiring several operations besides blanking.

The strip enters the press from a reel at the back of the machine, and is fed by a slide feed which may be so accurately adjusted as to remove the need for pilot pins. The transfer fingers not only transfer the blank to various stations, but they also retain their grip until the punches make contact. Scrap winds up on a reel at the front of the press, and finished stampings are ejected at a high rate of speed.

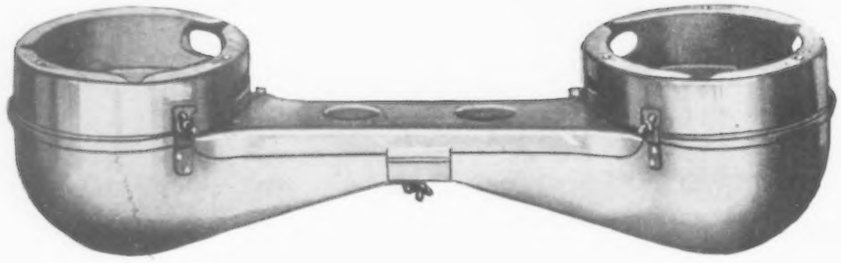
All punches have independent adjustments. The punches, dies, transfer slide and fingers constitute a unit which may be removed from the press *in a very few* minutes. This important feature eliminates time-consuming tool set-ups when changing over from one job to the next.

Over 60 years of Baird engineering skill and experience are embodied in this new Automatic Multiple Transfer Press which is built in six sizes to take strips 1½" to 6" in width. Get the full details of this new development.

"Ask BAIRD About It"

THE BAIRD MACHINE COMPANY
BRIDGEPORT, CONN.

METAL STAMPINGS



Forty years of concentration on producing Metal Stampings, exclusively, has given us a wide experience which is available to you.

Crosby Equipment is complete for stamping: Gas, Electric or Spot Welding; Japanning and Assembling.

If you have never used Crosby Service, let us figure on your next stamping job.

THE CROSBY COMPANY

General Offices and Works: BUFFALO, NEW YORK

Branch Offices: **Chicago Detroit Cleveland New York Philadelphia**

The WEAN CONTINUOUS STRIP PICKLER

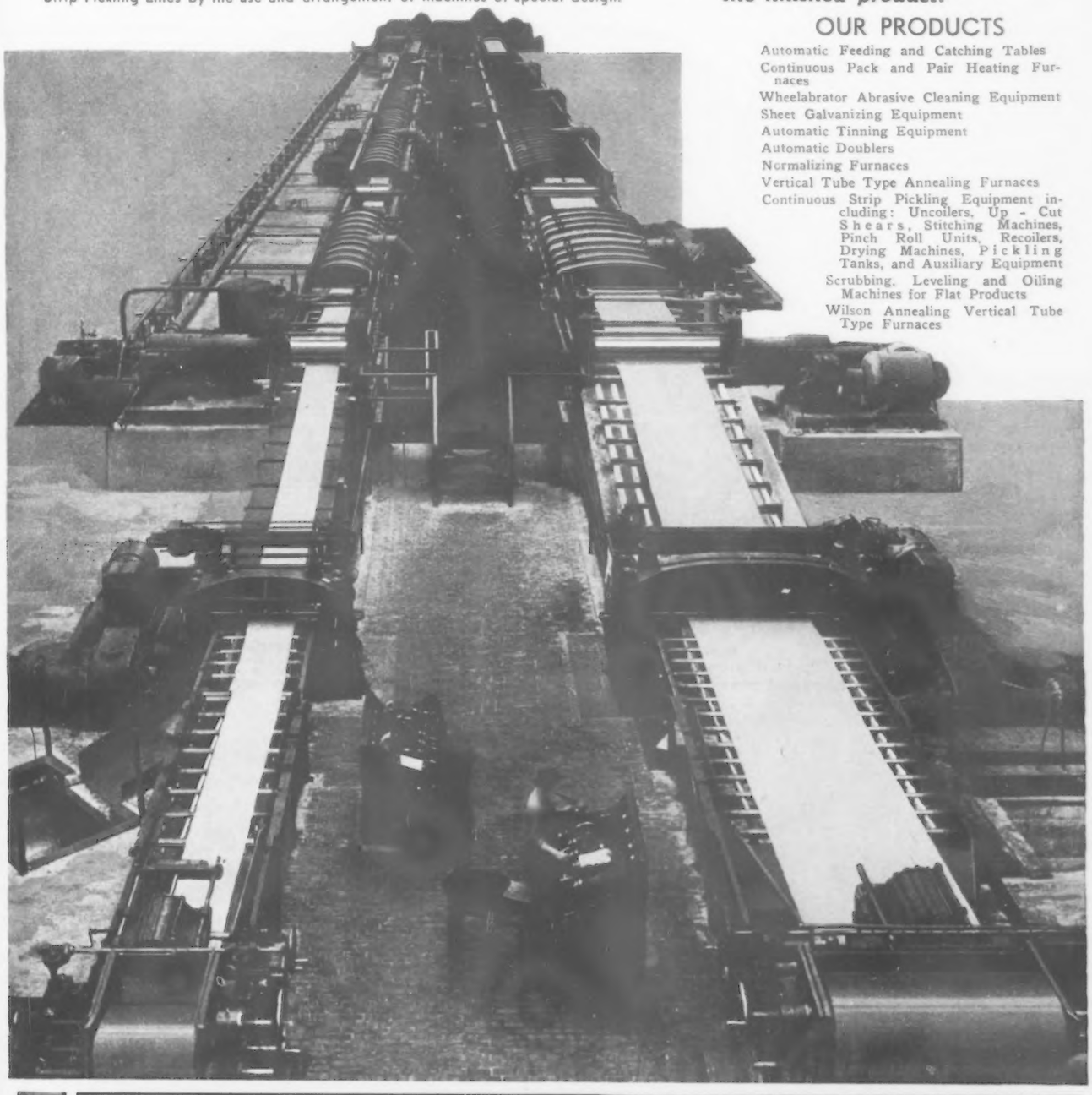
The WEAN CONTINUOUS PICKLING UNIT, now being offered to the flat rolled industry by the Wean Engineering Company, Inc., consists of machinery of special design to permit the most efficient production of the finest quality of pickled material.

Higher speeds are possible and greater tonnage procurable on the Wean Continuous Strip Pickling Lines by the use and arrangement of machines of special design.

The continuous pickling unit can be furnished complete from the handling of the hot strip coil to the finished product.

OUR PRODUCTS

- Automatic Feeding and Catching Tables
- Continuous Pack and Pair Heating Furnaces
- Wheelabrator Abrasive Cleaning Equipment
- Sheet Galvanizing Equipment
- Automatic Tinning Equipment
- Automatic Doublers
- Normalizing Furnaces
- Vertical Tube Type Annealing Furnaces
- Continuous Strip Pickling Equipment including: Uncoilers, Up - Cut Shears, Stitching Machines, Pinch Roll Units, Recoilers, Drying Machines, Pickling Tanks, and Auxiliary Equipment
- Scrubbing, Leveling and Oiling Machines for Flat Products
- Wilson Annealing Vertical Tube Type Furnaces



The WEAN ENGINEERING CO. INC.

WARREN·OHIO·

ASSOCIATE COMPANIES

The FLINN & DREFFEIN CO. The McKAY MACHINE CO. LEE WILSON ENGINEERING CO.

JUST BETWEEN US TWO

On the Whole, Good

IN another week 1935 will be history, so this is a good time to count our marbles and take stock of skinned knuckles:

1. *The, what we fondly call, "family" of* IRON AGE *readers has grown comfortably during the year.*
2. *Advertising volume has picked up so fast that "Ho hum, another one," instead of a loud "Look! Look!" greets each new contract.*
3. *The number of certified readers of this column has leaped from 16 to 17.*

Although we searched our memory ten full seconds for something to place on the debit side, we find nothing. Readers have been generous in their praise, moderately considerate of the Oberleutnant's horror of superlatives, and sparing in adverse criticism.

On the whole, it has been a pleasant year for us, and, we hope, for you. May 1936 be even pleasanter.

Fussy

A.W.M., our fair-weather friend and severest critic, lashes into us for calling "more" and "better" superlatives, when, in fact, they are comparatives. The man who rates a big dictionary moved his desk to the other side of the office, so our etymological errors will probably increase, as it is now quite a walk.

They Wish We Were Broader

THE criticism that recurred most frequently during 1935 came veiled as a compliment, and is found in that towering stack of letters lauding the editorials by John H. Van Deventer, our editor. Almost every letter says, *"Some way ought to be found to put these editorials before everybody in the country."* Here we can see the dictator glaring into his Dictaphone or Ediphone (both are subscribers), and implying that we should find the way.

The criticism is well given. Our circulation is limited to the industries manufacturing and distributing metals and metal products. If we strayed from our appointed course and wandered among manufacturers of aminoazotoluene, alfalfa meal, sheep dip, synthetic silk, camisoles, pickles, pop corn, and so on, our advertisers would be disturbed no end.

To compensate for the fact that THE IRON AGE, though potent in its own field, is a negligible factor in most others, we have generously waived our copyright and are permitting newspapers, house organs, other business papers and periodicals to reprint the editorials. They are using the privilege.

Painless Predictions

IF you are obliged to do any forecasting or budgeting for 1936, we commend you to the chart on page 19 of the Nov. 14 IRON AGE. You will notice that the economist who supplied the figures for the chart was not foolish enough to trust his reputation to a single figure. He made high, medium and low guesses. This is hardly the sporting thing for a forecaster to do, being too much like saying, "I bid from three to seven spades."

However, the method has undeniable advantages, and, is just about what those who demand forecasts deserve.

Plenty of Power, But No Wills

THE beshorted young lady in the foreground of the photograph on page 31 of the Dec. 31 IRON AGE should have been told that she was holding a tennis racket. It looks to us as if she was about to swat the fly that put a .000001-in. curve in a ½-in. bar, 1 ft. long.

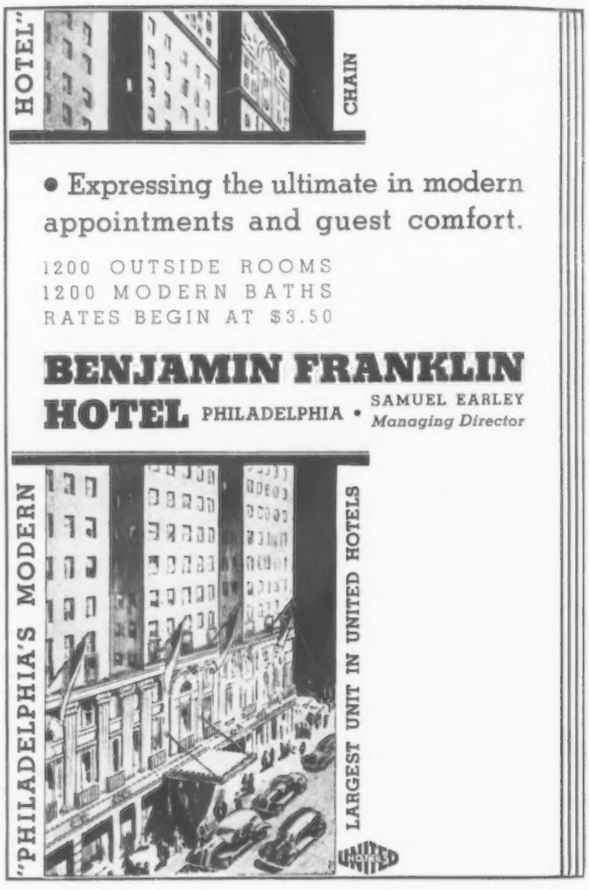
Stilly Night

Joe Fuller sends us a clipping from an Atlanta, Ga., newspaper, stating that Christmas sales of firecrackers in the South hit boomtime peaks. The leading fireworks jobber says, "Government money is responsible." Bang goes our sixpence.

Cause, Effect

(1) The editorial staff is on the verge of a nervous breakdown owing to overwork. (2) Next week's issue, our Annual Number, will be the finest we have ever published. It may be a day late but you'll forgive us when you see it.

Happy New Year! —A. H. D.


HOTEL"
CHAIN
• Expressing the ultimate in modern appointments and guest comfort.
1200 OUTSIDE ROOMS
1200 MODERN BATHS
RATES BEGIN AT $3.50
BENJAMIN FRANKLIN HOTEL PHILADELPHIA • SAMUEL EARLEY Managing Director
"PHILADELPHIA'S MODERN
LARGEST UNIT IN UNITED HOTELS

All Kinds of Contacts Are Made Through the Classified Sections

The classified sections of THE IRON AGE are a frequent means of contact for all kinds of services.

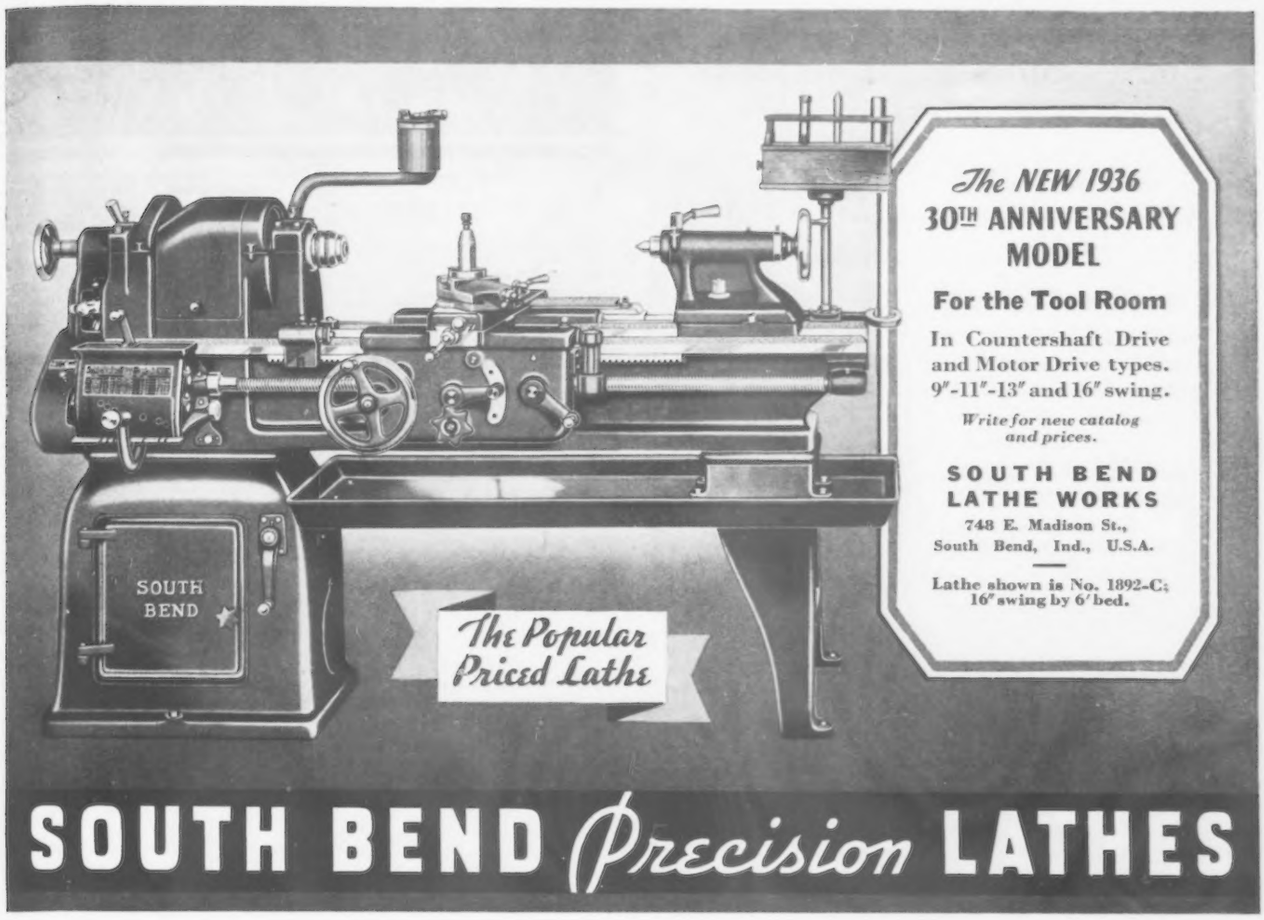
Somebody wants to locate a company to make certain parts or machines for him, and turns to the Contract Manufacturing Section.

Somebody else is looking for a bargain in used equipment and turns to the Clearing House Section.

Another is watching for Business Opportunities, and keeps his eye on that section.

Then, of course, there is the active Employment Section where men and positions get together.

See the pages following the Products Index.



The NEW 1936
30TH ANNIVERSARY MODEL

For the Tool Room

In Countershaft Drive and Motor Drive types. 9″-11″-13″ and 16″ swing.

Write for new catalog and prices.

SOUTH BEND LATHE WORKS
748 E. Madison St.,
South Bend, Ind., U.S.A.

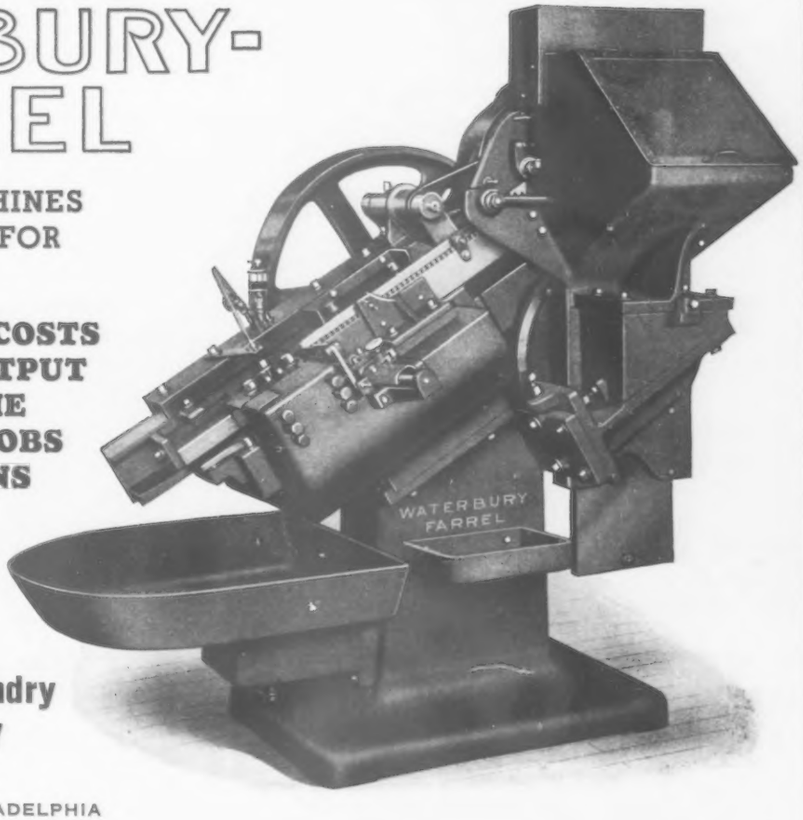
Lathe shown is No. 1892-C; 16″ swing by 6′ bed.

SOUTH BEND *Precision* LATHES

WATERBURY-FARREL

THREAD ROLLING MACHINES
MEET THE DEMANDS FOR

ACCURATE WORK
LOWER PRODUCTION COSTS
GREATER HOURLY OUTPUT
MINIMUM SET UP TIME
DIFFICULT FEEDING JOBS
SPECIAL APPLICATIONS



LET US GIVE YOU OUR
RECOMMENDATIONS

The Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut

CLEVELAND CHICAGO PHILADELPHIA

Cone 4-Spindle Automatics

Are economical and accurate producers of screw machine parts up to 6" diameter, 7" milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 634 E. Congress St., Detroit, Mich.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1077 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnston Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y.; also Rochester, N. Y.
Pennsylvania: Arch Machinery Co., 1005 Park Bldg., Pittsburgh, Pa.
Philadelphia: Lloyd & Arms, Inc., 133 South 36th St., Phila., Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif.

SELF-OILING, ALL-GEARED DRILLERS and HYDRAULIC INTERNAL HONERS

BARNES DRILL CO., 815 CHESTNUT ST., ROCKFORD, ILL., U.S.A.

LELAND-GIFFORD COMPANY

Worcester, Mass.
Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

"LUCAS PRECISION"

Horizontal Boring, Drilling and Milling Machine
THE LUCAS MACHINE TOOL CO.
NOW AND ALWAYS OF
CLEVELAND, OHIO, U. S. A.

FIFTY YEARS' EXPERIENCE

Cash or Terms—Allowance on old tool

Hot and Cold Swaging Machines . . Hammering Machines . . Sensitive Drills . . Multiple Spindle Drilling and Tapping Machines . . Multiple Spindle Attachable Drill Heads . . Automatic Drilling and Tapping Units . . Special Machinery.

ALSO REBUILT TOOLS OF OUR OWN MAKE

LANGELIER MFG. CO., PROVIDENCE, R. I.

METALINE

(REGISTERED TRADE MARK)

OILLESS BEARINGS THAT REQUIRE NO ATTENTION

R. W. RHOADES METALINE CO., INC.
43—3rd St., Long Island City, N. Y.

IF A COMPANY IN YOUR LINE

has found a better way of doing a thing, the probabilities are that your business paper tells about it.

Products Index

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norton Co., Worcester, Mass.

ABRASIVES—Steel Shot and Grit
American Foundry Equipment Co., 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

ACID RECOVERY EQUIPMENT
Chemical Construction Corp., 30 Rockefeller Plaza, New York City.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.

AIR TANKS AND CYLINDERS
Scaife, William B., & Sons Co., Ptgh.

ALLOYS—Calcium-Silicon
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Copper
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

ALLOYS—Magnesium
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.
Riverside (N. J.) Metal Co.
Ryerson, Jos. T., & Son, Inc., Chicago.

ALLOYS—Silico-Manganese
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Titanium
Metal & Thermit Corp., 120 B'way, N. Y. C.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 120 Broadway, N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording
Bristol Co., The, Waterbury, Conn.

AMMONIA RECOVERY PLANTS
Koppers Construction Co., The, Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES
United Engineering & Fdry. Co., Ptgh.
Wilson, Lee Engineering Co., Cleveland.

ANODES—All Types
Seymour (Conn.) Mfg. Co.
Udylite Co., The, Detroit.

ANODES—Cadmium
Udylite Co., The, Detroit.

ARBORS
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose
Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chi.

AXLES—Car or Locomotive
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.

BALING PRESSES—Scrap—See Presses—Baling

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Fafnir Bearing Co., New Britain, Conn.
Hartford (Conn) Steel Ball Co., The.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Acme Steel Co., Chicago.
Bethlehem (Pa.) Steel Company.
Inland Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARREL COATING & RENOVATING MACHINES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

BARRELS—Tumbling
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn) Steel Ball Co., The.

BARS—Alloy
Republic Steel Corp., Youngstown, Ohio.

BARS—Aluminum.
Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper
Bunting Brass & Bronze Co., Toledo, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.

BARS—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.
Pacific Coast Steel Corp., San Francisco, Calif.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

BARS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

BARS—Steel
Ames, W., & Co., Jersey City, N. J.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Joseph T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

BASES—Column, Machinery
Lukens Steel Co., Coatesville, Pa.

BATTERIES—Storage
Edison Storage Battery, Div. of Thomas A. Edison, Inc., West Orange, N. J.
Electric Storage Battery Co., The, Phila.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Ball
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Ryerson, Jos. T., & Son, Inc., Chicago.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, Ohio.
Rhoades, R. W. Metaline Co., Inc., Long Island City, N. Y.

BEARINGS—Quill
Bantam Ball Bearing Co., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Roll Neck
Bantam Ball Bearing Co., The, South Bend, Indiana.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Ball Bearing Co., The, South Bend, Indiana.
Hyatt Roller Bearing Co., Newark, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Ball Bearing Co., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Ball Bearing Co., The, South Bend, Indiana.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

Products Index

BEARINGS—Shaft Hanger
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., Newark, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BEARINGS—Thrust
Bantam Ball Bearing Co., The, South Bend, Indiana.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Graton & Knight Co., Worcester, Mass.

BELT FASTENERS
Bristol Co., The, Waterbury, Conn.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Graton & Knight Co., Worcester, Mass.

BELT LACER
Bristol Co., The, Waterbury, Conn.
Clipper Belt Lacer Co., Grand Rapids, Mich.

BELT LACING
Graton & Knight Co., Worcester, Mass.

BELTING CEMENT
Graton & Knight Co., Worcester, Mass.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Graton & Knight Co., Worcester, Mass.
Schiereh, Chas. A., Co., 30 Ferry St., N. Y. C.

BELTING—Metal, Conveyor, High and Low Temperature
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., Akron, Ohio.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.
Wallace Supplies Mfg. Co., Chicago.

BENDING MACHINES—Hand and Power
Buffalo (N. Y.) Forge Co., 492 B'way
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Machine & Tool Works, Buffalo, N. Y.
Wallace Supplies Mfg. Co., Chicago.

BENZOL RECOVERY PLANTS
Koppers Construction Co., The, Pittsburgh.

BERYLLIUM COPPER
Riverside (N. J.) Metal Co.

BILLETS—Alloy Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Carbon Vanadium Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Chrome Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Die Block Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Central Iron & Steel Co., Harrisburg, Pa.
Harrisburg (Pa.) Steel Corp.
Lukens Steel Co., Coatesville, Pa.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Youngstown, Ohio.

BILLETS—Nickel Steel
Andrews Steel Co., The, Newport, Ky.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethlehem (Pa.) Steel Company.
Central Iron & Steel Co., Harrisburg, Pa.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BLANKS, STEEL—Gear, Flywheel
Lukens Steel Co., Coatesville, Pa.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Gas Furnace Co., Elizabeth, N.J.
Buffalo (N. Y.) Forge Co., 492 Broadway.
Spencer Turbine Co., Hartford, Conn.

BLOWERS—Centrifugal
General Electric Co., Schenectady, N. Y.

BLOWPIPES — Soldering, Heating, Annealing
Weldit Acetylene Co., Detroit.

BOARDS—Hammer
Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

BOLT CUTTERS
Acme Mchry. Co., Cleveland, O.
Landis Mch. Co., Inc., Waynesboro, Pa.
National Mchry. Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
National Mchry. Co., Tiffin, Ohio.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

BOLT & RIVET CLIPPERS
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS—Special
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.

BOLTS—Track
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Ames, W., & Co., Jersey City, N. J.
Clark Bros. Bolt Co., Milldale, Conn.
Oliver Iron & Steel Corp., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BORING BARS
Bullard Co., The, Bridgeport.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.

BORING & DRILLING MACHINES—Vertical
Bullard Co., The, Bridgeport.

BORING MACHINES—Diamond
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

BORING MACHINES—Diamond & Carbide Tools
Herld Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport.

BRAKES—Electric
Cutler-Hammer, Inc., Milwaukee.

BRAKES—Electric & Mechanical
Clark Controller Co., Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Metal Forming
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Massillon (Ohio) Refractories Co.

BRICK—Insulating
Massillon (Ohio) Refractories Co.

BRIDGE BUILDERS
American Bridge Co., Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BROACHES
Connecticut Broach & Machine Co., New London, Conn.
National Broach & Mch. Co., Detroit.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Seymour (Conn.) Mfg. Co.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh.
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Elevator
Jeffrey Mfg. Co., The, Columbus, Ohio.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUILDINGS—Steel
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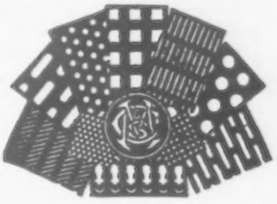

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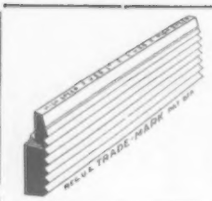

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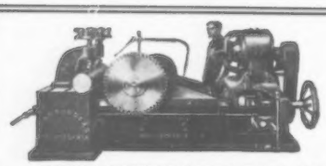

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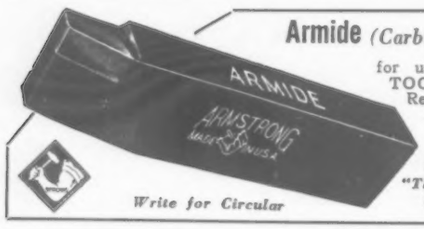

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Products Index

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
Wilson, Lee Engineering Co., Cleveland.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Phosphor Bronze Smelting Co., The, Phila.
Ryerson, Jos. T., & Son, Inc., Chicago.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Ryerson, Jos. T., & Son, Inc., Chicago.

BY-PRODUCTS COKE AND GAS OVENS
Koppers Construction Co., The, Pittsburgh.

CABLE—Electric
General Electric Co., Schenectady, N. Y.

CABLEWAYS AND TRAMWAYS — See Tramways

CADMIUM
Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Udylite Co., The, Detroit.

CALCIUM CARBIDE
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIC
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING—See Heat Treating

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Bartlett, C. O., & Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Ampco Metal, Inc., Milwaukee, Wis.
Centre Foundry & Mch. Co., Wheeling, W. Va.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Alloy Iron
Centre Fdry. & Machine Co., Wheeling, W. Va.
Forging & Casting Corp., The, Ferndale, Mich.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Aluminum Industries, Inc., Cincinnati.

CASTINGS—Brass, Bronze, Copper or Aluminum
Aluminum Industries, Inc., Cincinnati.
Cadman, A. W., Mfg. Co., Pittsburgh.
Phosphor Bronze Smelting Co., The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.
Aluminum Industries, Inc., Cincinnati.

CASTINGS—Electric Steel
Industrial Steel Casting Co., The, Toledo.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Centre Fdry. & Machine Co., Wheeling, W. Va.
Midvale Co., The, Nicetown, Phila., Pa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.)) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

CASTINGS—Gray Iron Production
Forest City Foundries Co., The, Cleveland.

CASTINGS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Semi-Steel Alloy
Centre Fdry. & Machine Co., Wheeling, W. Va.
Forest City Foundries Co., The, Cleveland.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Crucible Steel Castings Co., Lansdowne, Pa.
Industrial Steel Castings Co., The, Toledo.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CEMENT—Quick Setting, Acid Proof and Insulator
Nukem Products Corp., 68 Niagara St., Buffalo.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Massillon (Ohio) Refractories Co.

CEMENT—Rubber
Goodrich, B. F., Co., Akron, Ohio.

CENTERING & MILLING MACHINES
Jones & Lamson Mch. Co., Springfield, Vt.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O., & Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Whitney Mfg. Co., Hartford, Conn.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O., & Snow Co., The, Cleveland.
Whitney Mfg. Co., Hartford, Conn.

CHAINS—Silent
Link-Belt Co., Chicago.
Whitney Mfg. Co., Hartford, Conn.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Rust Proofing
Alrose Chemical Co., Providence, R. I.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.

CLAMPS—Boiler Plate Handling
Never Slip Safety Clamp Co., Grand Central Annex, P. O. Box 448, N. Y. C.

CLAMPS—Machinists'
Danly Machine Specialties, Inc., Chicago.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Ford, J. B., Co., The, Wyandotte, Mich.
Nukem Products Corp., 68 Niagara St., Buffalo.

CLEANING EQUIPMENT (METAL)—Electro-Chemical
Bullard Co., The, Bridgeport.

CLEANING MATERIALS—Glass
Nukem Products Corp., 68 Niagara st., Buffalo.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Hilliard Corp., The, Railroad Ave., Elmira, N. Y.
Medart Co., The, St. Louis, Mo.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Magnetic Mfg. Co., 626 South 28th St., Milwaukee.

COAL
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O., & Snow Co., The, Cleveland.
Industrial Brownhoist Corp., Bay City, Mich.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COBALT, METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COCKS—Drain & Shut-Off
Weatherhead Co., The, Cleveland.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Construction Co., The, Pittsburgh.

COKE OVENS—By-Products
Koppers Construction Co., The, Pittsburgh.

Products Index

COKE OVENS—Cross Regenerators
Koppers Construction Co., The, Pittsburgh.
COKE OVENS—With Recovery of By-Products
Koppers Construction Co., The, Pittsburgh.
COMPOUNDS—Drawing
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Oil Co., 17 Battery Place, N. Y. C.
COMPRESSORS—Air
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Bway., N. Y. C.
Spencer Turbine Co., Hartford, Conn.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Mchry. Corp. Harrison, New Jersey.
COMPRESSORS—Gas
Worthington Pump & Mchry. Corp. Harrison, New Jersey.
CONCRETE REINFORCEMENT
American Steel & Wire Co., Chicago.
CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Bway., N. Y. C.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.
CONTRACTORS' SUPPLIES — Second Hand. (See Clearing House Section)
CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.
CONTROLLERS—Electric
Clark Controller Co., Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co. The, Cleveland.
General Electric Co., Schenectady, N. Y.
CONTROLLERS—Valve, Electrically Operated
Cutler-Hammer, Inc., Milwaukee.
Vickers, Inc., 1420 Oakman Blvd., Detroit.
CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O., & Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
CONVEYORS—Portable
Jeffrey Mfg. Co., The, Columbus, Ohio.
Robins Conveying Belt Co., 15 Park Row N. Y. C.
COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
CORE OIL
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.
CORUNDUM WHEELS — See Grinding Wheels
COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spg. Co., Pontiac, Mich.
Western Wire Prods. Co., St. Louis, Mo.
COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
COUNTER—Production
Veeder-Root, Inc., Hartford, Ct.
COUNTERS—Revolution, Recording
Bristol Co., The, Waterbury, Conn.
COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.
COUPLINGS—Cut-Off Friction
Hilliard Corp., The, Railroad Ave., Elmira, N. Y.
COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co., Pittsburgh.
CRANES—Crawling Tractor
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., Chicago.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.
CRANES — Electric, Industrial, Truck Mounted
Elwell-Parker Electric Co., The, Cleveland.
CRANES—Electric Traveling
Armel, James P., Pitgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.
CRANES—Gantry
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.
CRANES—Hand Power
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
CRANES—Jib
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
CRANES—Locomotive
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.
CRANES—Monorail
American Monorail Co., Cleveland.
Cleveland Tramrail, Wickliffe, Ohio.
Louden Mchry. Co., Fairfield, Iowa.
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
CRANES—Portable
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Michigan Tool Co., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Hartford, Conn.
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Landis Mch. Co., Inc., Waynesboro, Pa.
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Buckeye Portable Tool Co., The, Dayton, O.
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Warner & Swasey Co., The, Cleveland.
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Fosdick Mch. Tool Co., The, Cincinnati.
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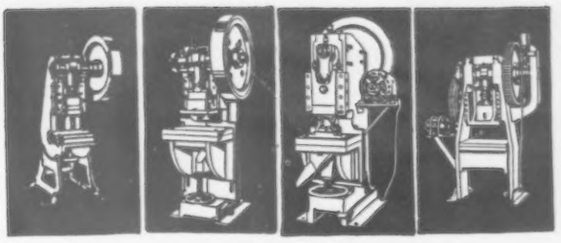

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EMERY WHEELS—See Grinding Wheels

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ENGINES—Gas
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Worthington Pump & Mchry. Corp., Harrison, New Jersey.

ENGINES—Oil
Ingersoll-Rand Co., 11 Bway., N. Y. C.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

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Booth Felt Co., Inc., The, 435—18th St., Brooklyn, N. Y.

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Pittsburgh (Pa.) Steel Co.

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Atlas Drop Forge Co., Lansing, Mich.
Canton (Ohio) Drop Forging & Mfg. Co.
Canton (Ohio) Forge & Axle Co.
Forging & Casting Corp., The, Ferndale, Mich.
Oliver Iron & Steel Corp., Pittsburgh.
Rockford (Ill.) Drop Forge Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

Products Index

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.

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Holcroft & Co., Detroit.
Mahr Mfg. Co., Minneapolis, Minn.
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General Electric Co., Schenectady, N. Y.
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Wilson, Lee Engineering Co., The, Cleveland.

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Heald Mch. Co., Worcester, Mass.

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Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Co., Hartford, Conn.

GRINDING MACHINES—Hob
Barber-Colman Co., Rockford, Ill.

GRINDING MACHINES—Internal
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

GRINDING MACHINES—Portable Flexible Shaft
Strand, N. A., & Co., Chicago.

GRINDING MACHINES—Portable Pneumatic
Buckeye Portable Tool Co., The, Dayton, O.
Ingersoll-Rand Co., 11 Bway., N. Y. C.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Roll
Cincinnati (Ohio) Grinders, Inc.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Snagging
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Heald Mch. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.

GRINDING MACHINES—Tool
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders, Inc.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEEL DRESSERS AND CUTTERS
Calder, Geo. H., Co., Lancaster, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Carborundum Co., The, Niagara Falls, N. Y.
Macklin Co., Jackson, Mich.
Norton Co., Worcester, Mass.

GRIPS—Cable
Smith Devices, Philadelphia.

GRIPS—Plate
Smith Devices, Philadelphia.

GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.

HAMMERS—Air, Forging
Nazel Engng. & Mch. Wks., Philadelphia.

HAMMERS—Drop
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, Ohio.

HAMMERS—Pneumatic
Ingersoll-Rand Co., 11 Bway., N. Y. C.

HAMMERS—Power
Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, Ohio.

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Fafnir Bearing Co., New Britain, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Roller Bearing Co., Newark, N. J.

HARDNESS TESTING MACHINES
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

HEADING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
National Mchry. Co., Tiffin, Ohio.

HEADING MACHINES—Automatic, Electric
National Mchry. Co., Tiffin, Ohio.

HEADS—Spun and Pressed
Lukens Steel Co., Coatesville, Pa.
Worth Steel Co., Claymont, Del.

HEADS—Steel—Flanged & Dished
Lukens Steel Co., Coatesville, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Corp., Niagara Falls, N. Y.

HEAT TREATING
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace Co., The, Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Chicago.
Parish Pressed Steel Co., Reading, Pa.

HEATERS—Unit
Buffalo (N. Y.) Forge Co., 492 B'way.
Nelson, Herman Corp., The, Moline, Ill.

HEATING RESISTANCE—Non-Metallic
Globar Corp., Niagara Falls, N. Y.

HEATING & VENTILATING APPARATUS
Nelson, Herman Corp., The, Moline, Ill.

HOBS
Michigan Tool Co., Detroit.

HOISTS—Air
Detroit (Mich.) Hoist & Mach. Co.
Ingersoll-Rand Co., 11 Bway., N. Y. C.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
American Monorail Co., Cleveland.
Wright Mfg. Co., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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American Engineering Co., Philadelphia.
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Detroit (Mich.) Hoist & Mach. Co.
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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Co., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
Cleveland Tramrail, Wickliffe, Ohio.
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HOISTS—Monorail
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Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HONING MACHINES
Barnes Drill Co., Rockford, Ill.

HOOKS—Plate Handling
Never Slip Safety Clamp Co., Grand Central Annex, P. O. Box 448, N. Y. C.

HOOPS—Wire
American Steel & Wire Co., Chicago.

HOSE—Gasoline & Oil-Proof
Weatherhead Co., The, Cleveland.

HOSE—Rubber
Goodrich, B. F., Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

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Wood, R. D., & Co., Philadelphia.

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HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

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Shenango Furnace Co., Pittsburgh.
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Phosphor Bronze Smelting Co., The, Phila.

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INSTRUMENTS—Recording
Bristol Co., The, Waterbury, Conn.

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Newport (Ky.) Rolling Mill Co., The.

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IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

IRON—Staybolt
Burden Iron Co., Troy, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

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LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Clipper Belt Lacer Co., Grand Rapids, Mich.

Products Index

LACQUER
Roxalin Flexible Lacquer Co., Inc., Elizabeth, New Jersey.
Sherwin-Williams Co., Cleveland.
Zapon Co., The, Stamford, Conn.

LAMPS—Filament
General Electric Co., Cleveland, Ohio.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LATHES—Automatic
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport.
Jones & Lamson Mch. Co., Springfield, Vt.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.

LATHES—Bench
Pratt & Whitney Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 E. Madison St.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Pratt & Whitney Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 E. Madison St.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
Pratt & Whitney Co., Hartford, Conn.

LATHES—Turret
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Turret, Vertical
Bullard Co., The, Bridgeport, Conn.

LEAD—In Oil
Sherwin-Williams Co., Cleveland.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEGGINS—Safety
Safety Equipment Service Co., Cleveland.

LEVELING MACHINES
Wean Engineering Co., Inc., The, Warren, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gasoline
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Industrial
Jeffrey Mfg. Co., The, Columbus, Ohio.
Plymouth (Ohio) Locomotive Works.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Refining Co., Pittsburgh.
Penola, Inc., Pittsburgh.
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Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

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Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

MACHINE GUARD MATERIALS
Erdle Perforating Co., Rochester, N. Y.

MACHINE WORK
General Machine Works, York, Pa.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand. (See Clearing House Section)

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Carborundum Co., The, Perth Amboy, N. J.

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Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

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Metal & Thermit Corp., 120 B'way, N. Y. C.

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Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

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American Numbering Mch. Co., 224 Shepherd Ave., Brooklyn, N. Y.
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

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Worcester (Mass.) Stamped Metal Co.

METERS—Water & Oil
Worthington Pump & Mchry. Corp., Harrison, N. J.

MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES — Second-Hand. (See Clearing House Section)

MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLYBDENUM
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Cleveland Tramrail, Wickliffe, Ohio.

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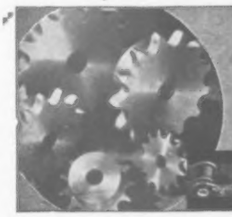
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Products Index

NAILS—Wire
American Steel & Wire Co., Chicago.
Continental Steel Corp., Kokomo, Ind.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pacific Coast Steel Corp., San Francisco, Calif.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL-CLAD STEEL
Lukens Steel Co., Coatesville, Pa.

NICKEL ANODES—Rolled or Cast
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

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Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

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National Mchry. Co., Tiffin, Ohio.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Castellated
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Thumb Malleable
Republic Steel Corp., Upson Nut Div., Cleveland, O.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Soluble—See Oils—Cutting

OILS—Cutting
Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
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Penola, Inc., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Oil Co., 17 Battery Place, N. Y. C.

ORES—Iron
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Construction Co., The, Pittsburgh.

OVENS—Core and Mold
Holcroft & Co., Detroit.
Mahr Mfg. Co., Minneapolis, Minn.

OVENS—Cross Regenerative
Koppers Construction Co., The, Pittsburgh.

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Mahr Mfg. Co., Minneapolis, Minn.

OXY-ACETYLENE—Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

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Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.
Booth Felt Co., Inc., The, 435—18th St., Brooklyn, N. Y.

PACKING—Hydraulic
Schieren, Chas. A., Co., 30 Ferry St., N. Y. C.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Graton & Knight Co., Worcester, Mass.
Schieren, Chas. A., Co., 30 Ferry St., N. Y. C.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.

PAINT
Sherwin-Williams Co., Cleveland.

PERFORATED METAL
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chi.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Mesta Mch. Co., Pittsburgh.

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Custodis, Alphons, Chimney Construction Co., 135 William St., N. Y. C.

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Durlon Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

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Hanna Furnace Corp., The, Detroit, Mich.
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PIG IRON—Charcoal
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PILING—Steel Pipe
National Tube Co., Pittsburgh.

PILING—Steel Sheet
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. B. & J., Palmer, Mass.

PINS—Airbrake
Champion Rivet Co., Cleveland, Ohio.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co., Pittsburgh.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Fisher Bros. Steel Corp., Morris Ave. & 139th St., Bronx.
Green Point Iron & Pipe Co., Inc., 187-197 Maspeth Ave., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co., Pittsburgh.
Pacific Coast Steel Corp., San Francisco, Calif.
Republic Steel Corp., Youngstown, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co., Pittsburgh.
Republic Steel Corp., Youngstown, Ohio.

PIPE CUTTING AND THREADING MACHINES
Jarecki Mfg. Co., Erie, Pa.
Landis Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PIPE FITTINGS
Crane Co., Chicago
Jarecki Mfg. Co., Erie, Pa.

Products Index

PIPE FITTINGS—For Welding
Taylor Forge & Pipe Works, Chicago.

PIPE, STEEL—Rubber Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.

PIPE & TUBE BENDING
Wallace Supplies Mfg. Co., Chicago.

PLANING MACHINES — Second-Hand. (See Clearing House Section)

PLANTS FOR SALE
McKey, Frank M., Trustee, Grigsby-Grunow Co., Inc., 5801 Dickens Ave., Chicago.

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Moulded
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.
General Plastics, Inc., 400 Walck Rd., No. Tonawanda, N. Y.
Richardson Co., The, Melrose Park, Ill.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Philadelphia.
Carnegie Steel Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Heavy Steel (up to 25 in. thick)
Lukens Steel Co., Coatesville, Pa.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Philadelphia.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Lukens Steel Co., Coatesville, Pa.
Pacific Coast Steel Corp., San Francisco, Calif.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATES—Nickel-Clad Steel
Lukens Steel Co., Coatesville, Pa.

PLATES—Wide Steel (up to 199 in.)
Lukens Steel Co., Coatesville, Pa.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., Pontiac, Mich.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Geuder, Paeschke & Frey Co., Milwaukee.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Coining
National Mchry. Co., Tiffin, Ohio.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.

PRESSES—Forging
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

PRESSES—Multiple Plunger
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

PRESSES—Trimming
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Magnetic Mfg. Co., 626 South 28th St., Milwaukee.

PULVERIZERS
Jeffrey Mfg. Co., The, Columbus, Ohio.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Bway., N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Bway., N. Y. C.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Vickers, Inc., 1420 Oakman Blvd., Detroit.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Rotary
Vickers, Inc., 1420 Oakman Blvd., Detroit.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Bway., N. Y. C.
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUMPS—Vacuum
Worthington Pump & Mchry. Corp., Harrison, New Jersey.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—15th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Buffalo (N. Y.) Forge Co., 492 B'way.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Spacing Mach. Co., Pittsburgh.

PYROMETERS—Indicating
Bristol Co., The, Waterbury, Conn.
Hoskins Mfg. Co., Detroit, Mich.

RAIL SPICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Foster, L. B., Co., Inc., Pittsburgh
Frank, M. K., 480 Lexington Ave., N. Y. C.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Robinson & Orr, Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.

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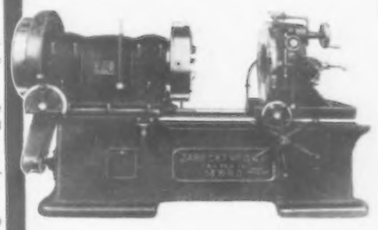

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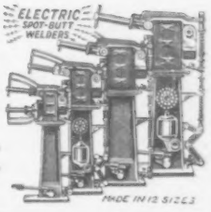

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Products Index

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Hartford, Conn.

REFRACTORIES
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.
Massillon (Ohio) Refractories Co.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FABRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland.
Manville, E. J., Mch. Co., Waterbury, Ct.
National Mchry. Co., Tiffin, Ohio.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Shuster, F. B., Co., The, New Haven, Ct.

RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Champion Rivet Co., Cleveland, Ohio.
Clark Bros. Bolt Co., Milldale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn, N. Y.
Oliver Iron & Steel Corp., Pittsburgh.
Progressive Mfg. Co., Torrington, Conn.
Ryerson, Jos. T., & Son, Inc., Chicago.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

RODS—Nickel Silver
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Seymour (Conn.) Mfg. Co.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co., Chicago.
Champion Rivet Co., Cleveland.
Lincoln Electric Co., The, Cleveland.
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Metal & Thermit Corp., 120 B'way, N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Wire
American Steel & Wire Co., Chicago.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
National Roll & Fdry. Co., Avonmore, Pa.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Sand Chilled Iron and Steel
Hyde Park (Pa.) Fdry. & Mach. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, Ohio.
American Sheet & Tin Plate Co., Ptgh.
Newport (Ky.) Rolling Mill Co., The.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Genuine Open Hearth Iron
Newport (Ky.) Rolling Mill Co.
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Iron and Steel
Newport (Ky.) Rolling Mill Co., The.

ROOFING AND SIDING—(Zinc) Corrugated and Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS—Tank
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., Akron, Ohio.

RUBBER MOLDED PARTS
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

RUST REMOVING
American Chemical Paint Co., Ambler, Pa.
Nukem Products Corp., 68 Niagara St., Buffalo.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O., & Snow Co., The, Cleveland.
Jeffrey Mfg. Co., The, Columbus, Ohio.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Wells Mfg. Co., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SCALES
Fairbanks, Morse & Co., Chicago.

SCREENS—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chi.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Michigan Wire Cloth Co., 2117 Howard St., Detroit.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace, Co., The, Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven, Conn.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.
Weatherhead Co, The, Cleveland

SCREW MACHINERY—Automatic
Cone Automatic Mach. Co., Inc., Windsor, Vt.

SCREW MACHINERY—Hand
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

Products Index

SCREW MACHINERY—Multiple Spindle
Cone Automatic Mach. Co., Inc., Windsor, Vt.

SCREW STOCKS
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Bristol Co., The, Waterbury, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Ottemiller Wm. H., Co., Inc., York, Pa.

SCREWS—Machines
Blake & Johnson Co., The, Waterville, Ct.
Progressive Mfg. Co., The, Hartford, Conn.

SCREWS—Safety Set
Bristol Co., The, Waterbury, Conn.
Progressive Mfg. Co., The, Hartford, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Bristol Co., The, Waterbury, Conn.
Cleveland (Ohio) Cap Screw Co., The.
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS, Socket, Head, Cap
Bristol Co., The, Waterbury, Conn.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y. C.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N. Y.

SECOND-HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milwaukee.
Magnetic Mfg. Co., 626 South 28th St., Milwaukee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

SHAFTING—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Steel
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Moltrup Steel Prods. Co., Beaver Falls, Pa.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A., Sons Co., Trenton, N. J.

SHEARING MACHINES—Alligator
Canton (Ohio) Fdry. & Mch. Co.

SHEARING MACHINES—Angle, Hand and Power
Buffalo (N. Y.) Forge Co., 492 Broadway.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
Buffalo (N. Y.) Forge Co., 492 Broadway.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Beam and Channel
Buffalo (N. Y.) Forge Co., 492 Broadway.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES—Billet
Buffalo (N. Y.) Forge Co., 492 Broadway.
Morgan Engineering Co., The, Alliance, Ohio.
Pels, Henry & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES, Plate
Bertsch & Co., Cambridge City, Ind.
Buffalo (N. Y.) Forge Co., 492 Broadway.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, Ohio.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—15th St., Hammond, Ind.
Buffalo (N. Y.) Forge Co., 492 Broadway.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEET BARS
Andrews Steel Co., The, Newport, Ky.
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mech. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Republic Steel Corp., Youngstown, Ohio
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Central Iron & Steel Co., Harrisburg, Pa.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Lukens Steel Co., Coatesville, Pa.
Newport (Ky.) Rolling Mill Co., The.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Riverside (N. J.) Metal Co.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
American Sheet & Tin Plate Co., Pgh.

SHEETS—Chrome Nickel
American Sheet & Tin Plate Co., Pgh.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pittsburgh.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Steel
American Sheet & Tin Plate Co., Pgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.

SHEETS — Enameling
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Pgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
American Sheet & Tin Plate Co., Pgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Youngstown (Ohio) Sheet & Tube Co., The.

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Products Index

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Ptgh.
Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Pacific Coast Steel Corp., San Francisco, Calif.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Long Terne
American Sheet & Tin Plate Co., Ptgh.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Magnesium Alloys
Dow Chemical Co., 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
American Sheet & Tin Plate Co., Ptgh.
Inland Steel Co., Chicago.
Newport (Ky.) Rolling Mill Co., The.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—Pickled
American Sheet & Tin Plate Co., Ptgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.
Superior Sheet Steel Co., Canton, Ohio.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Ptgh.
Empire Sheet & Tin Plate Co., Mansfield, Ohio.
Newport (Ky.) Rolling Mill Co., The.

SHEETS—Zinc
New Jersey Zinc Co., Inc., The, 160 Front St., N. Y. C.

SHOES—Horse and Mule
Burden Iron Co., Troy, N. Y.

SLABS
Andrews Steel Co., The, Newport, Ky.
Central Iron & Steel Co., Harrisburg, Pa.

SLINGS—Wire Rope
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engng. & Mch. Wks., Philadelphia.

SPACING TABLES—Punching & Shearing
Thomas Spacing Mach. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bullard Co., The, Bridgeport.
Conran, Frederick M., 107 Colden St., Newark, N. J.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

SPEED REDUCERS
Boston Gear Wks., Inc., North Quincy, Mass.
Link-Belt Co., Chicago.
Michigan Tool Co., Detroit.
Philadelphia (Pa.) Gear Works.

SPIKES—Track
Ames, W., & Co., Jersey City, N. J.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPINDLES—Grinding
Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit.

SPLICE BARS
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.

SPONGE IRON
Ekstrand & Tholand, Inc., 441 Lexington Ave., N. Y. C.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Car
American Steel & Wire Co., Chicago.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co., Chicago.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Cook Spring Co., Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Bristol, Conn.
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Raymond Mfg. Co., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Whitney Mfg. Co., Hartford, Conn.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Spring Co. Div. of Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dunbar Bros., Co., Bristol, Conn.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Geuder, Paeschke & Frey Co., Milwaukee.
Gibson, Wm. D., Co., Chicago.
Hubbard, M. D., Spring Co., Pontiac, Mich.
Lansing (Mich.) Stamping So., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Corry, Pa.
Sheet Metal Specialty Co., Pittsburgh, Pa.
Torrington (Ct.) Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Veeder-Root, Inc., Hartford, Ct.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

STAPLES—Wire
Continental Steel Corp., Kokomo, Ind.
Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie Steel Co., Pittsburgh.
Harrisburg (Pa.) Steel Corp.
Illinois Steel Co., Chicago.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Pacific Coast Steel Corp., San Francisco, Calif.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, Ohio.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Moltrup Steel Prods. Co., Beaver Falls, Pa.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Bright Finished
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
Andrews Steel Co., The, Newport, Ky.
Carnegie Steel Co., Pittsburgh.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
American Steel & Wire Co., Chicago.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

Products Index

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cold Drawn
American Steel & Wire Co., Chicago.
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Moltrup Steel Prods. Co., Beaver Falls, Pa.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
American Steel & Wire Co., Chicago.
Athenia Steel Co., 135 William St., N. Y.
Cold Metal Process Co., The, Youngstown, Ohio.
Griffin Mfg. Co., Erie, Pa.
Inland Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Thomas Steel Co., Warren, Ohio.
West Leechburg Steel Co., Pittsburgh.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electric Copper Coated
Thomas Steel Co., Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Thomas Steel Co., Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting
American Steel & Wire Co., Chicago.
Midvale Co., The, Nicetown, Phila., Pa.

STEEL—Crucible
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Andrews Steel Co., The, Newport, Ky.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Pacific Coast Steel Corp., San Francisco, Calif.

STEEL—Electric
Disston, Henry, & Sons, Inc., Philadelphia.
Inland Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervlieb, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Acme Steel Co., Chicago.
Illinois Steel Co., Chicago.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
West Leechburg Steel Co., Pittsburgh.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., Warren, O.

STEEL—Hot Rolled Strips, Galvanized
Acme Steel Co., Chicago.

STEEL—Magnet
Latrobe (Pa.) Electric Steel Co.

STEEL—Nickel
Andrews Steel Co., The, Newport, Ky.

STEEL—Open Hearth
Andrews Steel Co., The, Newport, Ky.
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Rustless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Screw
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Youngstown, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.
West Leechburg Steel Co., Pittsburgh.

STEEL—Spring
Athenia Steel Co., 135 William St., N. Y.
Barnes-Gibson-Raymond, Inc., Detroit.
Barnes, Wallace, Co., The, Bristol, Conn.
Gibson, Wm. D., Co., Chicago.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Co., The, Canton, O.

STEEL—Stainless
Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
American Steel & Wire Co., Chicago.
Bethlehem (Pa.) Steel Company.
Carnegie Steel Co., Pittsburgh.
Disston, Henry, & Sons, Inc., Philadelphia.
Illinois Steel Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Youngstown, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Co.

STEEL—Vanadium
Andrews Steel Co., The, Newport, Ky.
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
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Jones & Lamson Mch. Co., Springfield, Vt.

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Electric Controller & Mfg. Co., The, Cleveland.

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Conran, Frederick M., 107 Colden St., Newark, N. J.
Medart Co., The, St. Louis, Mo.

STRAIGHTENING MACHINES—Wire
Lewis Mch. Co., The, Cleveland.

STRAPPING—Box
Acme Steel Co., Chicago.

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American Bridge Co., Pittsburgh.
Mo.gan Engineering Co., The, Alliance, Ohio.

STRUCTURAL STEEL — See Angles, Beams, Channels and Tees

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Torrington (Ct.) Co.

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American Hard Rubber Co., 11 Mercer St., N. Y. C.
Goodrich, B. F., Co., Akron, Ohio.

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Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Elevated Wood
Hauser-Stander Tank Co., The, Cincinnati, Ohio.
Woolford, G., Wood Tank Mfg. Co., Phila.

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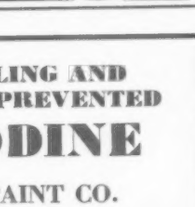

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Woolford, G., Wood Tank Mfg. Co., Phila.

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Cleveland (Ohio) Quarries Co., The.
Custodis, Alphons, Chimney Construction Co., 135 William St., N. Y. C.
Goodrich, B. F., Co., The, Akron, Ohio.
Nukem Products Corp., 68 Niagara St., Buffalo.
Woolford, G., Wood Tank Mfg. Co., Phila.

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Morse Twist Drill & Mch. Co., New Bedford, Mass.
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Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co.

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Republic Steel Corp., Youngstown, Ohio.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

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Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

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TRAILERS—Industrial — See Trucks, Tractors and Trailers—Industrial

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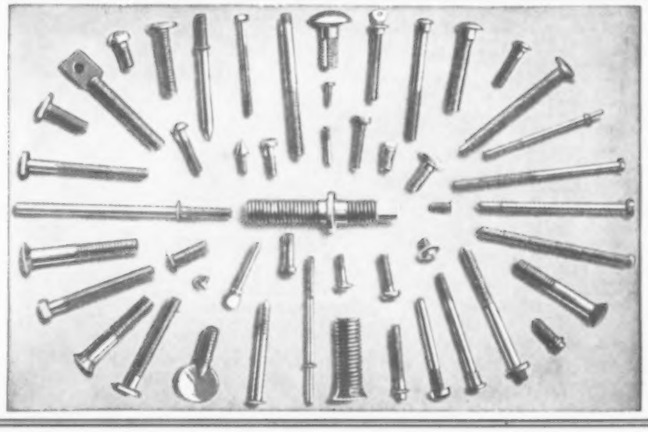

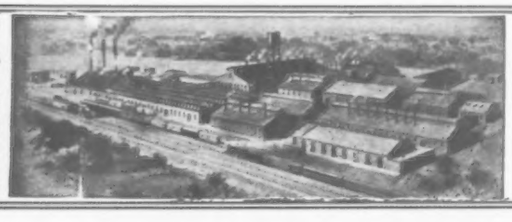

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MILLER, UNIV. No. 3 Cincinnati
MILLER, VERT. No. 3B Milwaukee
MILLER, DUPLEX. 24" & 48" Cincinnati
PIPE MACHINE. 8", No. 308 Oster
PLANER. 36"x36"x8' Gray
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32" King
48" and 54" Colburn
52" King
61" Bullard "Maxi-Mill"
62" Colburn, Heavy Duty, M.D.
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72" King Vert.
10' Niles, belt drive

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1, 2, 3, 4, 6 spdl. Leland-Gifford
1, 2, 4, 6 spdl. Henry & Wright
24" Cincinnati, slid. head
No. 121 Baker, M.D.
No. 2 Colburn, 1 spdl.
Boley multiple drillers and tappers

Radials, 3' Western, Timken Bearings
4' Western, heavy type
5' American, full univ., M.D.

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No. 4-48" Brown & Sharpe
No. 6-60" Brown & Sharpe
Nos. 9-H, 18-H Gould & Eberhardt
No. 36-BM Gould & Eberhardt, 3 spindle
Nos. 6, 61, 65, 612, 615, 7 Fellows
6" and 18" Gleason bevel gear
37" Gleason bevel gear planer

Grinders, 6" x 32" Norton, plain, M.D.
10"x24", 36", 50", 72", Norton, plain, M.D.
10"x36", 52", 96", Landis, plain
14"x36", 72", Norton, plain, M.D.
18"x96", Norton, plain, M.D.
20"x120", Landis, plain, M.D.
20"x168", Landis, plain, M.D.
No. 2 Brown & Sharpe Univ.
No. 4—12"x66", Landis Universal
No. 2 & No. 2½ Universal (Bath type)
No. 2 Cincinnati Centerless, M.D.
No. 70 Heald, Internal, M.D.
No. 1½ Landis, Internal
No. 3 and No. 33 Abrasive vert. surf.
No. 10—16" Blanchard, M.D.
14"x36" Pratt & Whitney vert surf. Mod. "B"
15"x17"x6' Norton O.S. surf. mag. chuck
No. 5 Springfield Planer Surface
36"x84" Diamond face, hyd. fd.

SPECIAL!
36"x36"x12' Liberty Open Side Planer
48"x48"x12' Cleveland Open Side Planer
48"x48"x14' Liberty Open Side Planer

Lathes, 8" Sundstrand Stub Lathe
No. 12 LeBlond Multi-Cut
13"x48" P. & W., Model "B"
14"x6' American, geared head
16"x6' Lodge & Shipley, sel. grd. hd.
18"x6' Lodge & Shipley, sel. grd. hd.
18"x8' Lodge & Shipley, cone drive
20"x8', 12', 14' L. & S., sel. grd. hd.
20"x12' American, geared head
24"x22' Lodge & Shipley, sel. grd. hd.
25"x24' LeBlond, grd. hd.
30"x12' Lodge & Shipley, sel. grd. hd.
36"x14' Lodge & Shipley, sel. grd. hd
36"x18' Lodge & Shipley, patent head
36"x18' Rahn-Larmon
36"x30' Rahn-Larmon, grd. head
66"x21', 36' Putnam, triple geared

Millers, No. 1-B, No. 2-B Milwaukee, plain
No. 0 Steptoe, plain
No. 2, No. 3 Cincinnati, high power, plain
No. 3-B, No. 4-B Heavy Brown & Sharpe, pl.
No. 3-B, No 4-B Milwaukee, plain
No. 4 Cincinnati, plain, high power
No. 2 Rockford Universal
No. 3, No. 4 Cincinnati high power, Universal
No. 2 & No. 3 Cincinnati H.P. Vertical
No. 3-B Milwaukee, Vertical
No. 4 Cincinnati high power, Vertical
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18" & 24" Cincinnati Auto. Duplex
No. 6 Lees-Bradner Thread

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26" Lynd-Farquhar O.S. planer, shaper
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36"x36"x10', 12' & 24' Gray
56"x56"x32' Cincinnati, 4 heads
72"x72"x12' Cincinnati, 4 heads

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No. 5-A Toledo, O.B.I. Grd.
No. 95-E Toledo, dbl. crank
No. 96-F Toledo, dbl. geared
No. 94-I Toledo, dbl. crank
50-ton Henry & Wright Dieing mch.

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16", 20", 24" American, S.P.D.
24" Gould & Eberhardt, S.P.D.
25" Smith & Mills

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No. 2-A Warner & Swasey
No. 3-A Warner & Swasey
No. 3-B Foster, M.D., taper att.
No. 4-L Gisholt, 9¼" H.S.

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Reversing Motor Drive
Excellent Condition

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BORING MILL, 12' BETTS VERTICAL
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Newton 84" Rotary Milling Machines, two heads, one roughing and one finishing, direct motor driven by 3 P 60C 220V motors, with automatic compensators, excellent condition.

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Niles-Bement-Pond
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60"x60"x32' NILES BEMENT POND Planer; 4 heads; motor drive with D.C. variable speed reversing motors; box table.
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10' Ohl press brake, 5/16" capacity, wt. 60,000 lbs., complete with motor.
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PRESS, double crank, 7" dia. crankshaft, 10" stroke, 40" shut-height, bolster 36"x80" tie-rod constructed.
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GRINDER, No. 78 Wilmarth & Morman Surface, motor in base.
SHEAR, 6'—8'—10', 10 gauge, 3/16" and ¼" cap.
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And a complete stock of fine up-to-date equipment.

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Machinery
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Many other tools.

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1—450 3 ph. 60 cy.		514	2200	G.E. S.R..	1,150
5—15 D. C.		500/1000	550	G.E.	290
2—20 D. C.		500/1000	550	G.E.	340
1—15-Ton Morgan Crane 68′ Span					3,500
2—15-Ton Morgan Cranes 52′ Span					3,000
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Built in 1934
Offered at $5.00 per H. P.

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1—200 H.P. Westinghouse Induction Motor, Type "CS," 3 Phase, 60 Cycle, 2200/4000 Volts, 1180 RPM.

2—250 H.P. Westinghouse Induction Motors, Type "CS," 3 Phase, 60 Cycle, 2200/4000 Volts, 1780 RPM.

6—250 H.P. General Electric Induction Motors, Type 95E776GI, 3 Phase, 60 Cycle, 2200/4000 Volts, 1780 RPM.

With Complete Starting Equipment

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H. P.	Make	Volts	Type	Speed
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1—600	G. E.	2200/550	ATI-Synch.	257
2—600	G. E.	2300/550	MT-Slip Ring	257
1—600	G. E.	2300/440	MT-Slip Ring	705
1—500	Al. Ch.	550	ANY-Slip Ring	505
1—450/360	West.	2200	CW-S. Ring	875/700
1—400	West.	2300	CW-Slip Ring	514
1—300	Al. Ch.	2200	ANY-Slip Ring	585
1—260	Al. Ch.	2200/440	Synch.	720
1—250	F. Mor.	2200	BV-Slip Ring	1200
2—200	West.	220/440	CW-Slip Ring	900
1—200	G. E.	220/440	I-M-Slip Ring	900
1—200	G. E.	2200/440	ATI-Synch.	900
1—150	G. E.	440	I-E13AA-S. R.	1750

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2000 tons, Usable pipe, 3" to 12".
Large quantity heavy valves.
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5—units 89' x 600'
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Can Also Be Used as Single Unit 445' x 730'

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50' x 100'	70' x 205'	85' x 190'
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Anything so long as it contains Steel

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100 Tons Good Used Cast Iron Water Pipe:

805 ft.	12 in.		12'0"
2 pcs.	48 "		6'0"
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11 pcs.	48 "		12'0" " "
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1 pc.	36 "		12'0" " "
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American-Lo-Hed
A.C. Electric Hoists
Motor Driven Trolley

Capacities:
2 Ton at 40' hoisting speed
3 Ton at 25' hoisting speed
4 Ton at 15' hoisting speed
3 phase, 60 cycle, 220 or 440 volts with push button control

2 Ton Shepard Lift About Electric Crane, 3 phase, 60 cycle, 220 or 440 volt plain push trolleys, pendant rope control.

Also In STOCK D.C. Hoists, 1000/8000# capacity
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Established 1910
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RECONDITIONED
SPECIALISTS—SKETCH WORK—FABRICATION
FISHER BROS. STEEL CORP.
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STEEL BUILDING STRUCTURES
ANY SIZE OR LOCATION
Are you in the market for anything?
IRON & STEEL PRODUCTS, Inc.
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Anything so long as it contains Iron or Steel

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I own and offer for sale the following:
1—10-ton Niles Crane, 50'0" span, 220 or 440 vo., 3 ph., 60 cy., inside type, 75% new—bargain.
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1—10-ton Shepard 37'0" span, 220 vo. D.C. Cage.
Several ½—2-ton Brown Hoists, 220 vo. D.C.
1-ton Maris; 2-ton Shepard, 220 vo. D.C.
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All Sizes in Stock
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FOR YOUR SURPLUS OF
BOLTS—NUTS—SCREWS
NO LOT TOO LARGE—NO LOT TOO SMALL
LET US HAVE YOUR OFFERINGS.
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25,000 lb.—No. 19 to 23 Soft Black
60,000 lb.—No. 18 to 20 Soft Galv.
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Please advise weight per yard and tonnage you want. We may have same in stock right near you. We can make very low prices on New Frog and Switch Material: also second-hand locomotives.
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We specialize in designing stampings to substitute castings. Dies designed and built for quantity production.
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OF EVERY DESCRIPTION
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1 lb. to 2000 lbs.
Capacity 16,000 lbs. per day
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Established 1850

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EMPLOYMENT SERVICE

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DISTRICT REPRESENTATIVES for industrial valves—brass, iron, steel. Investment necessary in sales organization. Engineers preferred. No age limit. Experience, reliability essential to us. Valves used in all classes industrial, institutional, oil, sugar refineries, mine, railway, utility power plants, etc. Sales national. Address Box R-229, care *The Iron Age*, 239 W. 39th St., New York.

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SALES REPRESENTATIVE well established with manufacturing trade Northern Illinois, Wisconsin, Iowa, Minnesota; Milwaukee headquarters; would like Brass and Aluminum forgings; also extruded metals account. Commission basis. Address Box R-219, care *The Iron Age*, 239 W. 39th St., New York.

FORGE SHOP EXECUTIVE. Years of experience and excellent record both production and management. Complete knowledge all details. Address Box C-1029, care *The Iron Age*, 311 Union Bldg., Cleveland, Ohio.

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EXECUTIVE. Experienced in metal-working line. Excellent record production and management. Available January first. Address Box C-1037, care *The Iron Age*, 311 Union Bldg., Cleveland, Ohio.

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RESEARCH AND DEVELOPMENT METALLURGIST AND COMBUSTION ENGINEER, experienced in conducting and directing research and industrial development in the field of gray iron and steel metallurgy and combustion engineering, desires a change to a position of larger opportunity. Address Box R-217, care *The Iron Age*, 239 W. 39th St., New York.

MANUFACTURING EXECUTIVE. Technical education. 16 years' experience production, planning, time-study, accounting, purchasing, factory operation and management. Desires responsible position in East with metal-working concern. Now employed as Factory Manager. Address Box R-228, care *The Iron Age*, 239 W. 39th St., New York.

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ADVERTISERS INDEX

A

Abrasive Mach. Tool Co. 80
Acme Machinery Co., The 86
Albert & Davidson Pipe Corp. ... 98
Albert Pipe Supply Co. 98
American Air Compressor Corp. . 97
American Chemical Paint Co. ... 92
American Gas Furnace Co. 86
American Optical Co. 63
American Rolling Mill Co., The . 70
American Spring & Mfg. Co. 89
American Telephone & Telegraph Co. 65
Armel, James P. 98
Armstrong-Blum Mfg. Co. 80
Armstrong Bros. Tool Co. 80
Athenia Steel Co., The 94
Atlas Car & Mfg. Co. 66
Atlas Drop Forge Co. 82
Automotive Hardware, Inc. 98

B

Baird Machine Co., The 74
Baldwin-Duckworth Chain Corp. . 85
Barker-Goldman-Lubin Co. 98
Barnes Drill Co. 78
Barnes, Wallace, Co., The 6
Belmont Iron Works 85
Belyea Co., Inc. 97
Bennett Mchry. Co. 97
Bethlehem Steel Co. 3
Bixby, R. W., Inc. 99
Brooke, E. & G., Iron Co. 88
Brotherhood, Percy M., & Son ... 97
Buffalo Forge Co. 55
Buffalo Wire Wks. Co., Inc. 92
Bullard Co., The 32

C

Cadman, A. W., Mfg. Co. 99
Canton Forge & Axle Co. 82
Canton Fdry. & Mch. Co. 84
Carboloy Co., Inc. 57
Cattie, Joseph P., & Bros. 99
Central Iron & Steel Co. 92
Champion Rivet Co., The 89
Chicago Flexible Shaft Co. 86
Clearing House Section 95-98
Cleveland Cap Screw Co., The ... 89
Cleveland Steel Tool Co., The .. 80
Climax Molybdenum Co. 69
Clipper Belt Lacer Co. 88
Cold Metal Process Co., The ... 81
Commonwealth Brass Corp. 87
Cone Automatic Mach. Co., Inc. .. 78
Contract Manufacturing Section .. 99
Crosby Co., The 74
Crucible Steel Castings Co. 83

D

Detroit Hoist & Mch. Co. 84
Donahue Steel Products Co. 97
Dreis & Krump Mfg. Co. 81
Dunbar Bros. Co. 90

E

Earle Gear & Mach. Co. 85
Eastern Machine Screw Corp., The 80
Eastern Tool & Stpg. Co., Inc. . 99
Eisler Engineering Co., Inc. 87
Elwell-Parker Electric Co., The. 73
Emerman, Louis E., & Co. 97
Employment Exchange Section .. 99
Espen-Lucas Mach. Wks., The .. 80
Essley, E. L., Mchry. Co. 96
Executive Placement Associates .. 99

F

Fairbanks, Morse & Co. 72
Falls Clutch & Mchry. Co. 84
Fisher Bros. Steel Corp. 97, 98
Flinn & Dreffein Co. 85
Foster, Frank B. 95
Foster, L. B., Co., Inc. 98

G

Ganey Mchry. Co. 95
Gelinas, A. R. 98
Goldman, Harvey H. 96
Goodman Electric Mchry. Co. ... 97
Greenpoint Iron & Pipe Co., Inc. 98
Griffin Mfg. Co. 81

H

Hanna Furnace Corp. 91
Harrington & King Perforating Co., The 61
Hassall, John, Inc. 89
Hayward Co., The 83
Hill-Clarke Mchry. Co. 95
Holcroft & Co. 94
Hotel Benjamin Franklin 76
Hubbard, M. D., Spring Co. 90
Hunter Steel Co. 97
Hyde Park Fdry. & Mach. Co. ... 88
Hyman, Joseph, & Sons 96
Hyman-Michaels Co. 98

I

Industrial Brownhoist Corp. 83
Industrial Machinery Corp. 95
Industrial Steel Casting Co. 83
International Nickel Co., Inc. 101
Iron & Steel Products, Inc. 98

J

Jarecki Mfg. Co. 87
Jones & Laughlin Steel Corp. ... 64

K

Knox, Earl E., Co. 97

L

Land, L. J. 98
Landis Machine Co., Inc. 80
Langelier Mfg. Co. 78
Latrobe Elec. Steel Co. 82
Lee Spring Co., Inc. 90
Leland-Gifford Co. 78
Leschen, A., & Sons Rope Co. ... 94
Lucas Mch. Tool Co., The 78

M

Malleable Iron Fittings Co. 83
Manufacturers Supply Co. 97
Medart Co., The 88
Midland Steel & Equip. Co. 97
Miles Mchry. Co. 95
Milne, A., & Co. 52
Morey Mchry. Co., Inc. 95
Morse Twist Drill & Mch. Co. ... 71
Motor Repair & Mfg. Co., The .. 97
Moyer, J. N. 96
Mundt, Chas., & Sons Co. 79

N

Nazel Engng. & Mch. Wks. 86
Nilson, A. H., Mch. Co. 86

O

O'Brien Mchry. Co., The 97
Oglebay, Norton & Co. 1
Ohio Electric Mfg. Co. 84
Ohio Locomotive Crane Co., The. 84
Olson Mfg. Co. 99
Ottemiller, Wm. H., Co., Inc. ... 89
Oviatt, D. C., & Co. 95

P

Parish Pressed Steel Co. 94
Parker-Kalon Corp. 89
Peoria Malleable Castings Co. ... 83
Perin Engineering Co., Inc. 85
Pittsburgh Lectromelt Furnace Corp. 86
Pittsburgh Metallurgical Co., Inc. 91
Progressive Mfg. Co., The 94

R

Republic Steel Corp. 2
Rhoades, R. W., Metaline Co., Inc. 78
Ridgway, Craig, & Son Co. 83
Ritterbush & Co., Inc. 97
Riverside Mchry. Depot 95
Robbins & Myers, Inc. 84
Robinson & Orr 98
Rockford Drop Forge Co. 82
Roebling's, John A., Sons Co. ... 4
Rosenkranz & Weisbecker 95
Ryerson, Jos. T., & Son, Inc. 8

S

Safety Equipment Service Co. ... 59
Samuel, Frank, & Co., Inc. 91
Screw Machine Products Corp. ... 89
Seneca Wire & Mfg. Co., The .. 93
Severin Mchry. Co. 95
Shaw-Box Crane & Hoist Co., Inc. 84
Shore Instrument & Mfg. Co. 92
Simmons Mch. Tool Corp. 95
Simonds Mfg. Co. 85
Sleeper & Hartley, Inc. 93
South Bend Lathe Works 77
Standard Pressed Steel Co. 89
Stanhope, R. C., Inc. 97
Stanley Works 81
Strand, N. A., & Co. 80
Superior Steel Corp. 81

T

Taft-Peirce Mfg. Co. 53
Taylor Forge & Pipe Wks. 87
Thomson-Gibb Elec. Welding Co. 87
Timken Steel & Tube Co. 102
Torrington Co., The 86

U

Union Drawn Steel Co. 67-68
United Engineering & Fdry. Co. 5
U. S. Steel Wire Spring Co. 90

V

V & O Press Co., The 81
Veeder-Root, Inc. 92

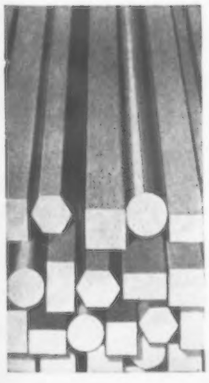
W

Wanted Section 98
Waterbury Farrel Fdry. & Mch. Co., The 77
Wean Engineering Co., Inc. 75
Webb Wire Wks., The 93
Wetherell Bros. Co. 82
Whiting Corp. 84
Worcester Stamped Metal Co. ... 82

CLASSIFIED SECTION

Clearing House 95-98
Contract Manufacturing 99
Employment Exchange 99
Wanted 98

Eyes on Steel



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GENERAL OFFICES: BETHLEHEM, PA.

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THE most exacting basis for judging wire rope performance is AVERAGE SERVICE.

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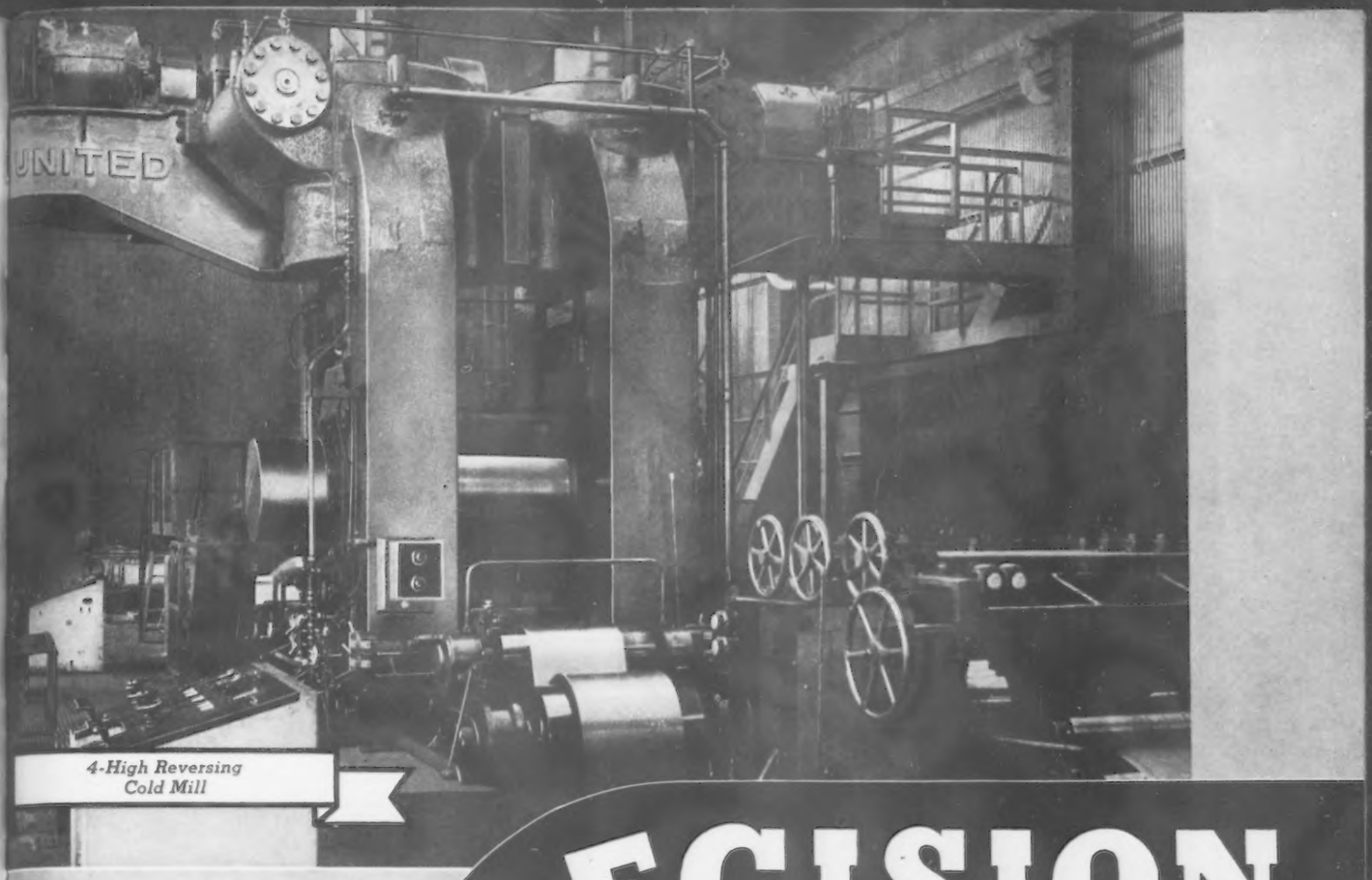
Trenton New Jersey



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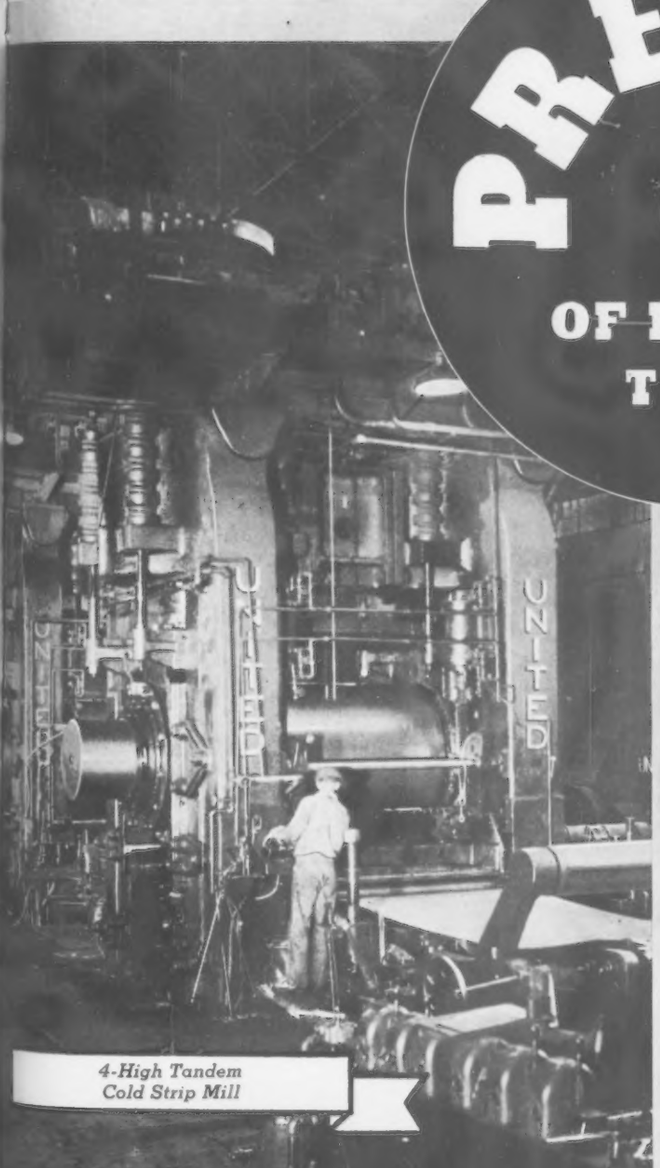
OF EVERY TYPE



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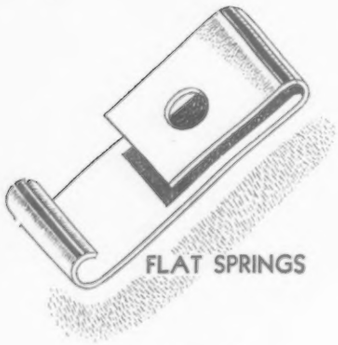
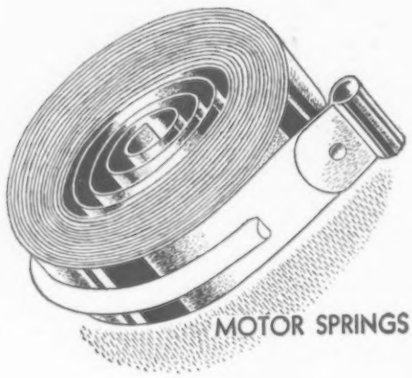


FLAT SPRINGS



MOTOR SPRINGS

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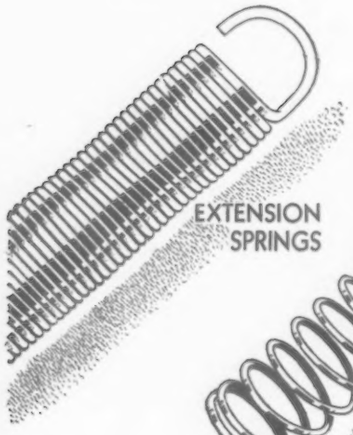
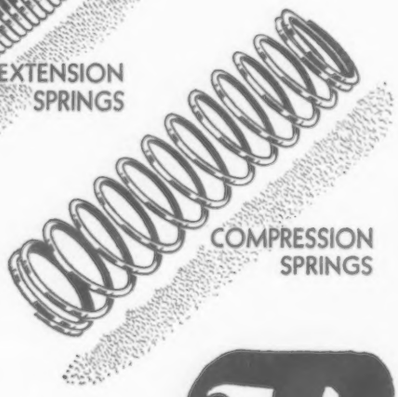


EXTENSION SPRINGS



COMPRESSION SPRINGS

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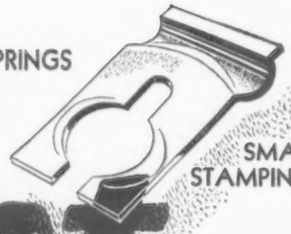

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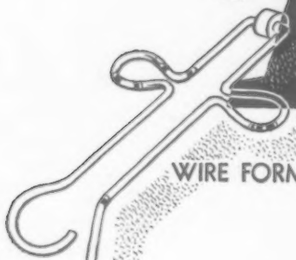
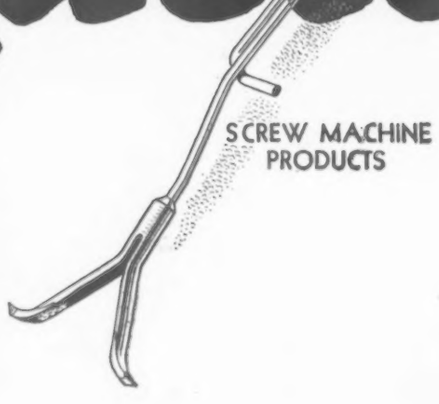


WIRE FORMS



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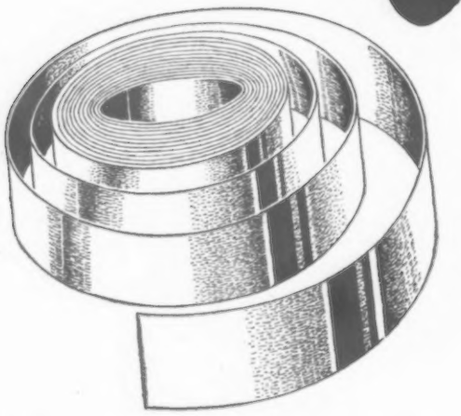

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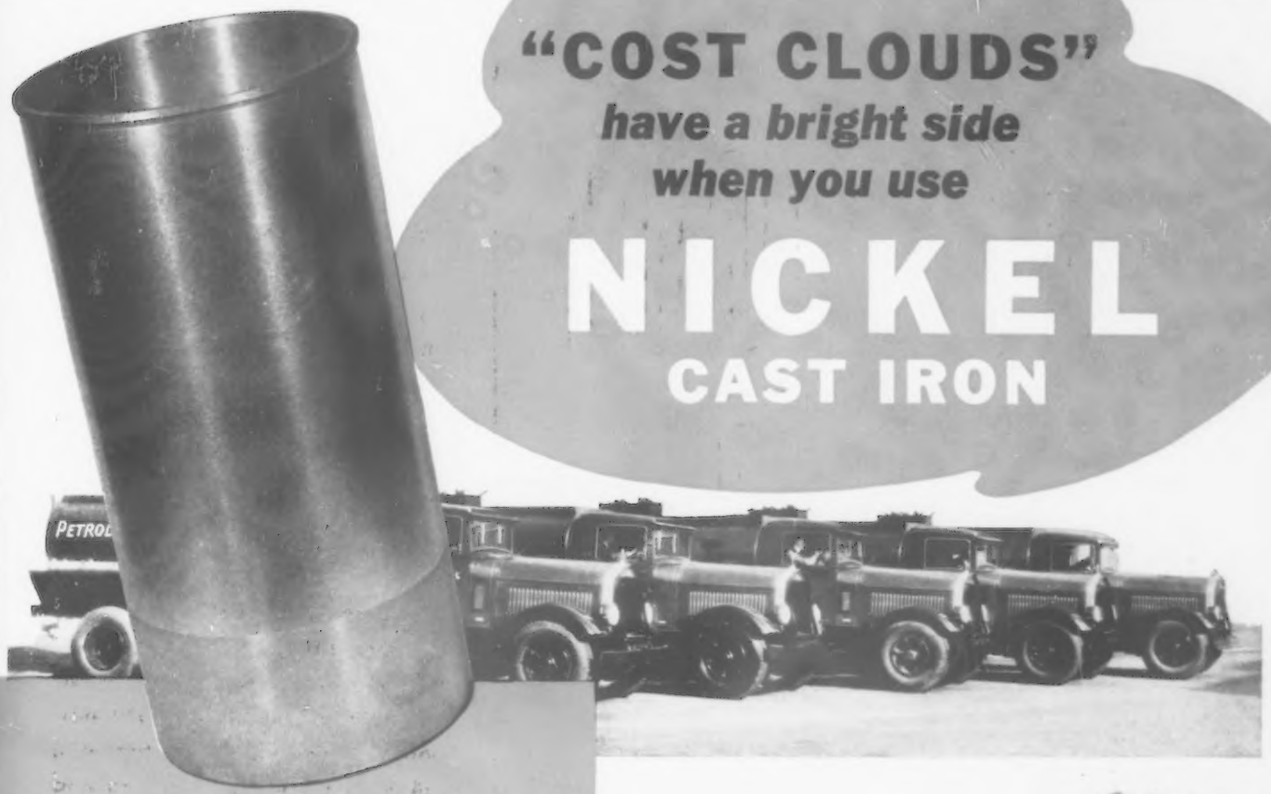
"COST CLOUDS"
have a bright side when you use
NICKEL
CAST IRON



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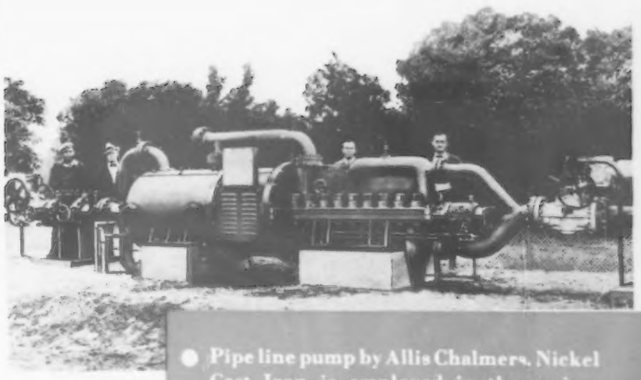

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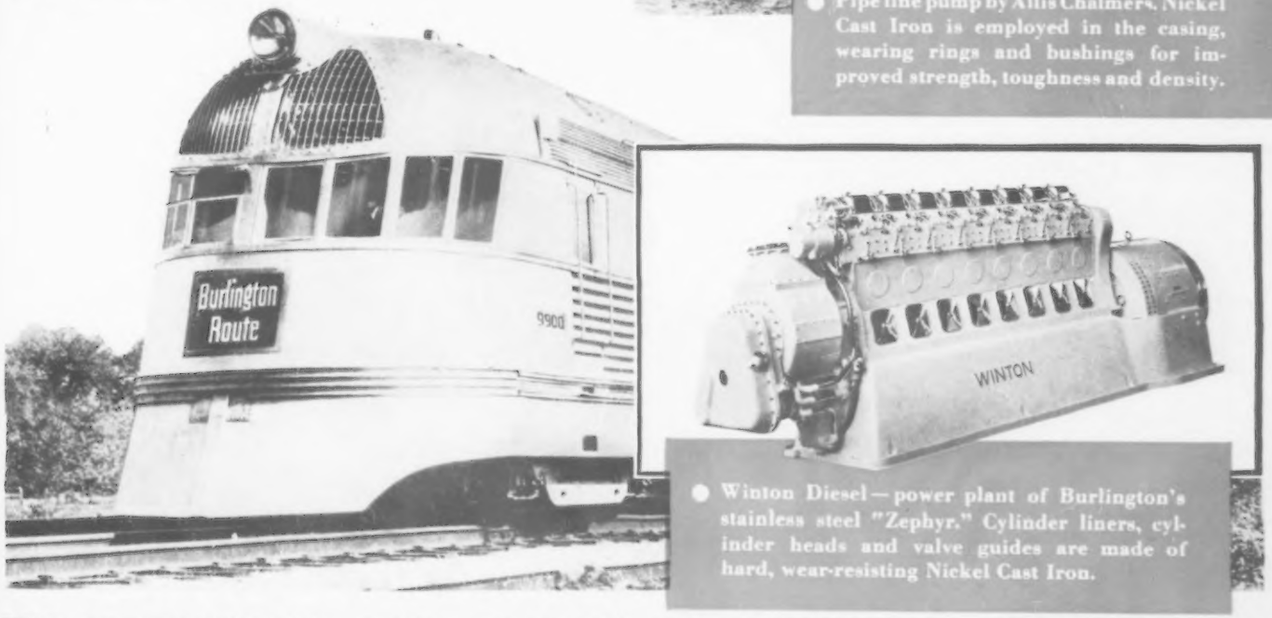

● Winton Diesel—power plant of Burlington's stainless steel "Zephyr." Cylinder liners, cylinder heads and valve guides are made of hard, wear-resisting Nickel Cast Iron.

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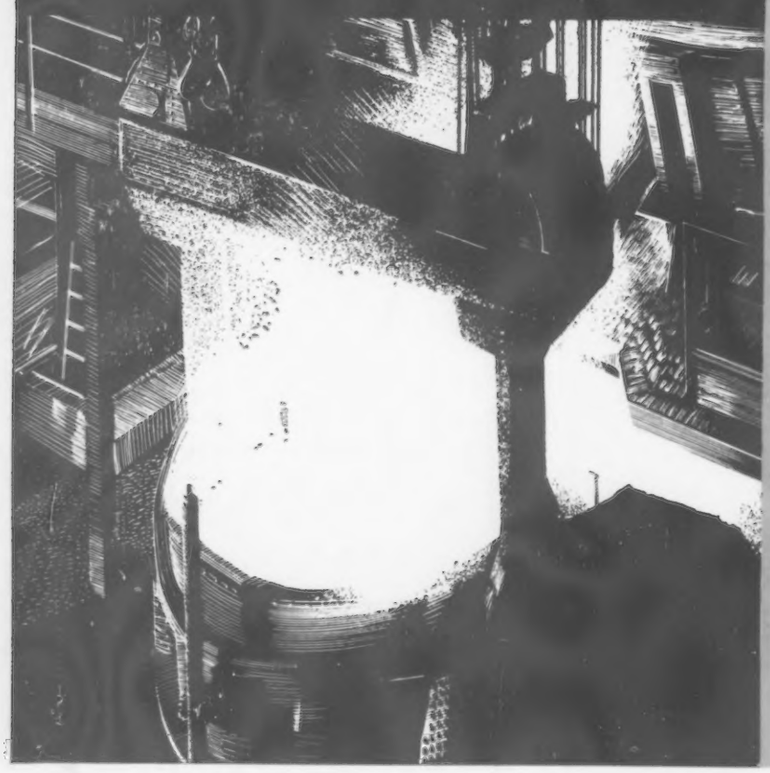
THE RIGHT STEEL

for every purpose



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World's Largest Producer of Electric Furnace Steel

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TIMKEN ALLOY STEELS

ELECTRIC FURNACE AND OPEN HEARTH • ALL STANDARD AND SPECIAL ANALYSES

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Higher speeds are possible and greater tonnage procurable on the Wean Continuous Strip Pickling Lines by the use and arrangement of machines of special design.

The continuous pickling unit can be furnished complete from the handling of the hot strip coil to the finished product.

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- Wheelabrator Abrasive Cleaning Equipment
- Sheet Galvanizing Equipment
- Automatic Tinning Equipment
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- Normalizing Furnaces
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- Scrubbing, Leveling and Oiling Machines for Flat Products
- Wilson Annealing Vertical Tube Type Furnaces

The WEAN ENGINEERING CO. INC.
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JUST BETWEEN US TWO

On the Whole, Good

IN another week 1935 will be history, so this is a good time to count our marbles and take stock of skinned knuckles:

1. *The, what we fondly call, "family" of* IRON AGE *readers has grown comfortably during the year.*
2. *Advertising volume has picked up so fast that "Ho hum, another one," instead of a loud "Look! Look!" greets each new contract.*
3. *The number of certified readers of this column has leaped from 16 to 17.*

Although we searched our memory ten full seconds for something to place on the debit side, we find nothing. Readers have been generous in their praise, moderately considerate of the Oberleutnant's horror of superlatives, and sparing in adverse criticism.

On the whole, it has been a pleasant year for us, and, we hope, for you. May 1936 be even pleasanter.

Fussy

A.W.M., our fair-weather friend and severest critic, lashes into us for calling "more" and "better" superlatives, when, in fact, they are comparatives. The man who rates a big dictionary moved his desk to the other side of the office, so our etymological errors will probably increase, as it is now quite a walk.

They Wish We Were Broader

THE criticism that recurred most frequently during 1935 came veiled as a compliment, and is found in that towering stack of letters lauding the editorials by John H. Van Deventer, our editor. Almost every letter says, *"Some way ought to be found to put these editorials before everybody in the country."* Here we can see the dictator glaring into his Dictaphone or Ediphone (both are subscribers), and implying that we should find the way.

The criticism is well given. Our circulation is limited to the industries manufacturing and distributing metals and metal products. If we strayed from our appointed course and wandered among manufacturers of aminoazotoluene, alfalfa meal, sheep dip, synthetic silk, camisoles, pickles, pop corn, and so on, our advertisers would be disturbed no end.

To compensate for the fact that THE IRON AGE, though potent in its own field, is a negligible factor in most others, we have generously waived our copyright and are permitting newspapers, house organs, other business papers and periodicals to reprint the editorials. They are using the privilege.

Painless Predictions

IF you are obliged to do any forecasting or budgeting for 1936, we commend you to the chart on page 19 of the Nov. 14 IRON AGE. You will notice that the economist who supplied the figures for the chart was not foolish enough to trust his reputation to a single figure. He made high, medium and low guesses. This is hardly the sporting thing for a forecaster to do, being too much like saying, "I bid from three to seven spades."

However, the method has undeniable advantages, and, is just about what those who demand forecasts deserve.

Plenty of Power, But No Wills

THE beshorted young lady in the foreground of the photograph on page 31 of the Dec. 31 IRON AGE should have been told that she was holding a tennis racket. It looks to us as if she was about to swat the fly that put a .000001-in. curve in a ½-in. bar, 1 ft. long.

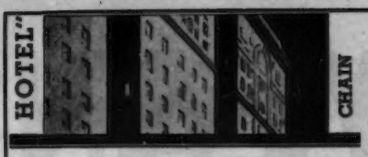
Stilly Night

Joe Fuller sends us a clipping from an Atlanta, Ga., newspaper, stating that Christmas sales of firecrackers in the South hit boomtime peaks. The leading fireworks jobber says, "Government money is responsible." Bang goes our sixpence.

Cause, Effect

(1) The editorial staff is on the verge of a nervous breakdown owing to overwork. (2) Next week's issue, our Annual Number, will be the finest we have ever published. It may be a day late but you'll forgive us when you see it.

Happy New Year! —A. H. D.



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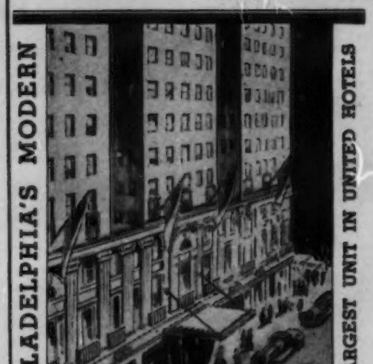

All Kinds of Contacts Are Made Through the Classified Sections

The classified sections of THE IRON AGE are a frequent means of contact for all kinds of services.

Somebody wants to locate a company to make certain parts or machines for him, and turns to the Contract Manufacturing Section.

Somebody else is looking for a bargain in used equipment and turns to the Clearing House Section.

Another is watching for Business Opportunities, and keeps his eye on that section.

Then, of course, there is the active Employment Section where men and positions get together.

See the pages following the Products Index.

THE IRON AGE SEMI-ANNUAL INDEX

JULY-DECEMBER, 1935—VOL. 136

Chilton Co., 239 West 39th Street, New York

Illustrated Articles Indicated by*

A

Abraham Lincoln Train:
Metal Dining Car*, Oct 10 p 80

Abrasives:
And Grinding Wheels for New Cutting Tools, Sept 5 p 235

Accidents:
Record of Republic Buffalo Plant, July 11 p 63
Safety Overalls in Fosdick Plant for Prevention*, Dec 26 p 46
Universal Atlas Cement Co.'s Record, July 11 p 70

Acme Machinery Co.:
All-Steel Forging Machine, Cushioned Drive*, Sept 12 p 31
Bolt Threader*, Oct 10 p 50

Acme Steel Co.:
Satinstrip — Steel Strip in Stripes and Patterns*, Sept 12 p 67

Adams Co., J. D.:
Portable Arc Welders*, Sept 12 p 34

Aetna-Standard Engineering Co.:
Acquires Sheet and Tin Plate License from Jones & Laughlin Steel Corpn., Aug 1 p 37
To Make Jones & Laughlin Sheet Classifier*, Oct 3 p 26

Aging:
Steel, Oct 10 p 31

Agitators:
Chapman, Wheeling Installation*, Dec 5 p 36

Air Conditioning:
Ford Machine Shops and Foundry, Aug 22 p 42-B

Air Conditioning Manufacturers' Association:
Setting Up Standards, Oct 10 p 98

Air Hygiene Foundation of America, Inc.:
To Study Air Hygiene, Dec 5 p 25

Airplanes:
Struts, Manufacture in Cleveland Pneumatic Tool Plant*, Dec 12 p 20

Air Reduction Sales Co.:
Cut-Off Machines, Portable Torch Beam*, Nov 14 p 36
Regulator, Heavy-Duty Two Stage*, Dec 26 p 17-G

Ajax Mfg. Co.:
Patent Infringement Suit, July 25 p 69

Allegheny Steel Co.:
Fernico, New Alloy Steel, Aug 1 p 46
Large Stainless Steel Plate, Oct 17 p 48
Numetal, New Alloy Steel, Sept 5 p 294
Quarterly Report, Nov 14 p 90
Stainless Steel Tubing, Sept 19 p 44
Stock Offering Not New, July 18 p 62

Allis-Chalmers Mfg. Co.:
Turbine Shipment for Boulder Dam*, Dec 26 p 17

Alloy Products Corpn.:
Self-Alining Coupling*, Nov 21 p 37

Alloy Steels:
Allegheny Mumetal, Sept 5 p 294
Aluminum in Commercial (Campbell Memorial Lecture)*, Oct 10 p 20; Oct 17 p 28
Application and Handling of Nickel and Other, Oct 31 p 75; Dec 26 p 18
Determination of Aluminum and Alumina in, Dec 26 p 23
Etching Reagents, A. S. T. M. Recommendations, July 18 p 24
Exhibition, Dec 12 p 55
Fernico, New, Aug 1 p 45
For Railroads and Automobiles, Dec 26 p 21
Hi-Steel, Inland New Low, Dec 19 p 45
Low, Welding, Oct 10 p 34
Mogul, Jessop Company to Make, Oct 24 p 54
Nickel-Aluminum Magnet, Aug 1 p 25
Scrap, Problems of Use, Nov 21 p 70
Selenium for Free Machining, Sept 12 p 28
Welding and Cutting High Chromium, Nov 21 p 48

Alloys:
Aluminum, Free Cutting, for Screw Machine Work*, July 25 p 27
Aluminum Jointing, Aug 1 p 25
Aluminum - Magnesium, Quenching Stresses and Precipitation, Oct 10 p 37
Ampco Metal for Forming and Drawing Dies*, July 25 p 22
Copper, Mallory 3 Metal, Aug 22 p 34
Copper, Resistance Welding, Oct 10 p 36
Copper, Thermal and Electrical Conductivities, Oct 10 p 38
Doler-Brass Die Casting, Oct 24 p 32
Etching Reagents for Aluminum, Copper and Nickel, A. S. T. M. Recommendations, July 18 p 24
I.J.D. for Acid Resistance, Sept 12 p 67
Kanthal, Electrical - Resistor, Oct 24 p 32
Molybdenum-Carbon, Oct 10 p 38
Non-Ferrous, Corrosion Data in Pickling Solution, July 18 p 23
Siemens & Halske Nickel-Copper-Iron, Oct 24 p 32
Stainless, for Lining Oil Cracking Units*, Nov 21 p 32

Almen, J. O.:
Spiral Gear Durability, Oct 24 p 38

Alumina:
Determination of in Steels, Dec 26 p 23

Aluminum:
Competition with Steel, Oct 17 p 36
Determination of in Steels, Dec 26 p 23
Etching Reagents, A. S. T. M. Recommendations, July 18 p 24
Gas Welding, Nov 21 p 50
In Commercial Steels (Campbell Memorial Lecture)*, Oct 10 p 21; Oct 17 p 28
Metropolitan-Vickers Mirrors, Oct 24 p 34
Plating Methods and Types of Finishes*, Aug 22 p 16

Aluminum Co. of America:
Free Cutting Aluminum Alloys for Screw Machine Work*, July 25 p 27
Manufacture of Aluminum Furniture*, Nov 28 p 30

American Barge Line:
River Barges with Cylindrical Tanks*, Dec 26 p 14

American Broach & Machine Co.:
Broaching Machine for V-8 Cylinder Heads*, Nov 14 p 34
Tunnel-Type Broaching Machine on Cylinder Block Operations*, July 4 p 32

American Chemical Paint Co.:
Cromodine Process for Rust-Proofing*, Oct 31 p 34

American Drop Forge Institute:
Succeeded by Drop Forging Association, July 18 p 53

American Engineering Council:
Annual Meeting Announcement, Dec 5 p 48

American Federation of Labor:
Organizes International Union of Automobile Workers of America, Aug 29 p 37; Sept 5 p 299

American Flange & Mfg. Co.:
Ferro-Therm, Steel Sheet Insulation*, Oct 24 p 34

American Fork & Hoe Co.:
Manufacture of Golf Shafts*, Oct 17 p 34-A

American Foundry Equipment Co.:
Electric Air Heater*, Dec 26 p 17-H
Wheelabrator Shipments to Russia, Nov 14 p 44

American Gear Manufacturers' Association:
Convention Proceedings, Oct 24 p 37

American Houses, Inc.:
Motohome—Prefabricated Steel Frame House*, Nov 7 p 35

American Institute of Mining and Metallurgical Engineers:
Meeting of Iron and Steel Division, Oct 10 p 37

American Institute of Steel Construction:
Awards Plaque to Cape Cod Canal Bridge, Aug 15 p 51
Bridge Prizes, Aug 8 p 58
Brooks, Robert T., Executive Vice-President*, Sept 19 p 45
Convention Proceedings, Oct 24 p 48
Iden, V. Gilmore, Secretary*, Sept 26 p 150-D
Plans Board Membership Service, July 18 p 49

American Iron and Steel Institute:
Correlation of Man-Hours Worked in Steel Industry and Automobile Production, Nov 7 p 102
Directory of Iron and Steel Works, July 4 p 94
Employee Representation in Steel Industry, July 18 p 48
Hook, Charles R., Succeeds George M. Verity as Director, Oct 17 p 37
Income from Sale of Products of Iron and Steel Industry, 1934, July 25 p 50
Ingots Yield Less Finished Steel Than 30 Years Ago, Aug 1 p 86
Iron and Steel Exports, 10 Months, Dec 12 p 52
Labor's Share Per Dollar of Sheet Steel Sales, 1923-1934, Dec 19 p 45
Man-Hours of Work in Raw Materials of Steel, 1934, Oct 24 p 57-B
Payrolls in Ohio River Steel Making Districts, 10 Months, Dec 19 p 46
Pig Iron and Ferroalloys Production First Half, Aug 22 p 42-A
Production of Steel Products for Sale in Second Quarter and First Half, Aug 29 p 61; Third Quarter, Nov 21 p 51
Sheet Steel and Automobile Prices, Nov 7 p 33
Stainless Steel Used in Watches, Dec 12 p 54
Steel Company Executives, Majority Worked Up from Ranks, Dec 12 p 54
Steel for Making Toys, Dec 19 p 45
Steel Freight Traffic, First Half, Dec 12 p 55
Steel Imports and Employment, July 18 p 48
Steel Industry's Earnings First Half, Sept 19 p 44
Steel Ingot Production, June, July 11 p 69; July, Aug 8 p 94; August, Sept 12 p 35; September, Oct 10 p 56; October, Nov 14 p 42; November, Dec 12 p 55
Steel Production, Analysis of First Half, Oct 3 p 94
Steel Production in Mahoning and Shenango Valleys, 1934, Aug 15 p 85
Stockholders in Steel Industry, Survey of, Oct 10 p 98
Taxes, 26 Steel Companies Since 1929, July 18 p 47
Tin Can Industry Centers in Illinois, Oct 31 p 49
Verity, George M., Vice-President*, Oct 24 p 57

American Lurgi Corpn.:
Vibrating-Push Conveyor for Hot Materials*, Aug 29 p 19

American Numbering Machine Co.:
Marking Machine with Automatic Feed*, Dec 5 p 49

American Revolution:
One at a Time! Dec 5 p 61

American Rolling Mill Co.:
Acquires Calco Iron Pipe Co, Ltd., Oct 17 p 37
Contracts for Continuous Strip Mill, July 25 p 43
Contracts with United Engineering & Foundry Co. for Hot Mill, Oct 10 p 80
Grants Continuous Sheet Rolling License to Richard Thomas & Co., Ltd., Dec 26 p 36
License Agreement with United Steel Works of Germany, Dec 19 p 46
Wins Prize for Sales Exhibit, Oct 24 p 54

American Screw Co.:
Screws with Phillips Recessed self-centering Head*, Nov 7 p 42

American Sheet & Tin Plate Co.:
Considering Construction of 96-In. Strip Mill, Oct 10 p 63
Losses Prevent Wage Advance, Oct 24 p 77
Tin Plate for Beer Cans*, July 4 p 28

American Society for Metals:
Convention Proceedings, Oct 10 p 28
Detroit Chapter Meeting, Nov 21 p 50-H
Pittsburgh Chapter Lecture Course, Oct 31 p 77

American Society for Testing Materials:
Committee to Study Gaseous Fuels, Oct 24 p 80
Convention Proceedings*, July 18 p 22

American Society of Mechanical Engineers:
Address of Ralph H. Flanders at Annual Meeting, Dec 5 p 20
Annual Meeting Program, Nov 7, p 96
Officer Nominations, July 4 p 178
Spring Meeting, July 4 p 184

American Steel & Wire Co.:
Cable-Type Highway Guard*, Dec 19 p 33
Dismantling Two Blast Furnaces, July 25 p 42
Dismantling Open-Hearth Furnaces and Converters at Newburgh Works, Sept 12 p 40
To Build Two Rod Mills, Dec 5 p 50

American Stove Co.:
Plant Light Increased with White Paint*, July 18 p 34

American Welding Society:
Fall Meeting Proceedings, Oct 10 p 34
Qualifying Welding Operators, Dec 26 p 29

Ampco Metal, Inc.:
Bronze as Forming and Drawing Die Material*, July 25 p 22

Amtorg Trading Corpn.:
Machinery Purchases, Aug 15 p 50

Andrews, Elmer F.:
State and Federal Job Insurance Laws, Nov 28 p 19

Andrus, O. E.:
Oil Cracking Units with Stainless Alloy Lining*, Nov 21 p 32

Angell Nail & Chaplet Co.:
Chaplet with Cut Shank Serrations*, Aug 15 p 39

Annealing:
Bright, Industrial Propane for*, July 25 p 30
With Vertical Hot Tubes*, Nov 21 p 26

Anodes:
Zam, New Plating, July 11 p 110

Anodizing:
Alloy Pistons in Buick Plant*, Nov 7 p 38

Anthes, Major L. L.:
Awarded John A. Penton Medal*, Aug 15 p 53

Apprenticeship:
Foundry Standards, July 11 p 35
Training Needed to Supply Skilled Labor Shortage, July 4 p 29
Training Urged, Oct 24 p 37

Art Iron & Wire Works:
Erecting Steel Frame House, Oct 10 p 43

Associated Business Papers, Inc.:
Annual Meeting, Dec 12 p 37
Editors Find Government Loans to Industry Inadequate, Oct 3 p 30
Guide to Applicants for Direct Loans, Nov 21 p 50-E

Associated General Contractors of America:
Convention Announcement, Nov 14 p. 42

Association of Iron and Steel Electrical Engineers:
Convention Proceedings, Oct 3 p 39
Wiley, Brent, Managing Director, Dec 26 p 37

Atchison, Topeka & Santa Fe Railway:
Large Diesel Locomotive*, Sept 12 p 37

Australia:
Pig Iron and Steel Production, July 4 p 66

Automatic Temperature Control Co.:
Repeat Time Controls, July 18 p 45

Automatics:
Developments in*, Sept 5 p 155

Automobile Industry:
Older Workers Favored, Nov 7 p 98
Ready for a Four-Million Car Year*, Oct 31 p 15

Automobile Manufacturers Association:
Older Workers Favored in Automobile Industry, Nov 7 p 98

Automobiles:
Deferred Replacements*, Sept 5 p 318
Length of Life, Chart*, July 25 p 38
Lincoln-Zephyr V-12*, Nov 7 p 56
Lincoln-Zephyr V-12 Production Innovations*, Dec 26 p 17-A
Packard One-Twenty, Machining Operations*, Nov 21 p 32

Available Truck Co.:
Arc Welding Trailer Frames*, Aug 15 p 29

B

Badlam, Stephen:
Review of Sheet, Tin and Strip Mills, Oct 3 p 75

Bailey, E. L.:
Induction Heating, Sept 26 p 149

Bain and Davenport:
Aging of Steel, Oct 10 p 31

Baker Brothers:
Hydraulic Vertical Drilling Machine*, Nov 21 p 38

Baker-Raulang Co.:
Hylift Truck*, Aug 1 p 33

Balancing Machine:
Micro-pois, at Graham-Paige Plant*, Oct 31 p 24

Baltimore & Ohio Railroad:
Metal Dining Car of Abraham Lincoln Train*, Oct 10 p 80

Band Saw:
Grob Table Slide for, Nov 14 p 36
Neff, Kolbusch & Bissell with Internal Filer*, Nov 28 p 39

Bantam Ball Bearing Co.:
Acquired by Torrington Co., Oct 3 p 36

Barber-Coleman Co.:
Hobbing Machine, Taper Spline*, Oct 10 p 48

Barber Tumbling Machine Co.:
Continuous Operation Tumbling Machine*, Dec 26 p 17-G

Barges:
River, With Cylindrical Tanks for Bulb Fuels*, Dec 26 p 14

Barimar, Ltd.:
Sopromo Welding Flame*, Oct 24 p 33

Barnes Drill Co.:
Hydraulic Ram Drilling Machines*, Aug 15 p 36

Bars:
Cold Finished, Extras Revised, Aug 1 p 71; Aug 8 p 52; Aug 29 p 37
Hot-Rolled Steel, Revised Extras and Prices, Sept 5 p 301

Battelle Memorial Institute:
Personnel, Oct 17 p 56

Bausch & Lomb Optical Co.:
Light Waves in Precision Measuring*, July 11 p 14
Surface Illuminator*, Nov 7 p 41

Beardsley & Piper Co.:
Swing Type Sandslinger*, Dec 5 p 49

Beardsley and Hamilton:
Gears, Methods for Checking*, July 18 p 14; Aug 1 p 20

Bearings:
Anti-Friction, Lubrication of*, Oct 3 p 14
Ball, Assembly, Dec 26 p 17-E
Ball, Norma-Hoffman Grea-Seal*, Dec 26 p 17-H
Ball, Testing Internal Structure*, Aug 1 p 25
Ford Rod, Coating Strip with Copper Lead for*, Aug 8 p 25
Micarta, Oil and Grease Lubricated*, Nov 14 p 22
Roller, Link-Belt Shafer Self-aligning*, Nov 14 p 34
Timken with Mirror Finish*, Oct 17 p 44

Bell & Howell Co.:
Finishing Motion Picture Cameras and Projectors*, Aug 15 p 16

Belt Lacer:
Clipper Vise*, July 25 p 37

Belting:
Dayton Oil-Proof V, Oct 24 p 41
Goodyear Transmission, Vulcanizing Method, Aug 1 p 33

Bending Machines:
Frank Automatic Tube*, July 18 p 44
Whiting Corrugating and*, Aug 1 p 34

Benjamin Electric Mfg. Co.:
Mercury Vapor Lamp Fixtures*, Oct 10 p 50

Berger Mfg Co.:
Berloy Steel Frame House*, Oct 10 p 86
Metal Stacks, Shelves and Racks for Government Archives Building*, Nov 21 p 29

Berry, Maj. George L.:
Industrial Conference, Dec 12 p 53

Bethlehem Steel Co.:
Absorbs McClintic - Marshall Corpn., Pacific Coast Steel Corpn. and Kalman Steel Corpn., Subsidiaries, Dec 26 p 61
Handbook on Alloy and Special Steels, Oct 24 p 34
Handbook on Steel Plates, Oct 24 p 55
Steel Castings for Golden Gate Bridge Cable Support*, Oct 3 p 30
To Start New Lackawanna Hot Strip Mill, Dec 5 p 77

Bethlehem Steel Corpn.:
Quarterly Report, Aug 1 p 47; Nov 7 p 58
Refunds $55,000,000 Bonds, July 4 p 66

Biggs Boiler Works Co.:
Welded Tank for Propane Gas Storage*, Aug 15 p 44

Billet Gouger:
Niles, Controlled by Sealed Operator*, Aug 8 p 18

Billet Peeler:
Niles*, Sept. 19 p 25

Black & Decker Mfg. Co.:
Junior Portable Drills, Oct 24 p 43

Blaha, J. H.:
Welding Distortion, Oct 10 p 35

Blaw-Knox Co.:
Semi-Annual Report, Aug 1 p 48

Bleakney, H. H.:
Soft Spots on Case Hardened Steel*, Dec 12 p 32

Bliss Co., E. W.:
High-Production Press*, Sept 19 p 33
Pedestal Mounted High-Speed Press*, Dec 5 p 45

Block, L. E.:
Chairman Inland Steel Co*, Sept 26 p 54
Message to National Metal Congress, Sept 26 p 53

Blueprinting Machine:
Milligan & Wright Angstrom Lamp*, Aug 15 p 41

Boats:
Construction of Pressed Steel*, Aug 1 p 23

Boils:
Open-Hearth, Sept 26 p 98

Book Reviews:
Alloy and Special Steels, Oct 24 p 54
Cast Metals Handbook—American Foundrymen's Association, July 4 p 63
Chromium Steels, Sept 19 p 23
Corrosion, Causes and Prevention, Aug 1 p 88
Directory of Iron and Steel Works, July 4 p 94
Engineering Radiography, Aug 1 p 92
Gas Industry Appliance Booklet, Dec 12 p 56
Heat Calculations for Design and Operation of Furnaces (German), Oct 24 p 79
Heat Treatment and Metallography of Steel, Aug 8 p 47
Metal Cleaning, Oct 24 p 77
Procedure Handbook of Arc Welding Design and Practice, Nov 7 p 112
Steel Plates, Bethlehem Handbook, Oct 24 p 55
Training Men for Supervisory Jobs, Dec 26 p 29

Boring:
Internal Surface Finishing, Sept 19 p 36-B

Boring Machines:
Developments*, Sept 5 p 121

Giddings & Lewis Horizontal Precision Drilling, Milling and*, Aug 1 p 32
Ingersoll Openside*, Dec 19 p 35
Moline Hydraulic*, July 25 p 35
Threading and Grooving on Vertical Turning and*, Dec 26 p 10

Boron:
Sweat-on or Cast-on for Metal Finishing, Sept 12 p 29

Boss's Diary, Aug 15 p 43; Oct 10 p 46; Nov 14 p 52

Boulder Dam:
Allis-Chalmers Shipment of Turbines for*, Dec 26 p 17

Bratt, Almer C.:
Steel Industry, How Can Growth be Measured*, Nov 15 p 18

Brazil:
Trade Agreement with United States, Nov 21 p 75; Dec 5 p 67

Brazing:
Metal Radio Tubes by Electric Furnace*, Dec 26 p 17-F

Brick Columns:
Lateral Steel Reinforcement for Strengthening*, Aug 15 p 24

Brick, Phillips and Smith:
Quenching Stresses and Precipitation Reaction in Aluminum - Magnesium Alloys, Oct 10 p 37

Bridges:
Cape Cod Canal Awarded A. I. S. C. Plaque, Aug 15 p 51
Golden Gate, Steel Castings for Cable Support*, Oct 3 p 29
Prizes for 1935, Aug 8 p 58

Briggs Mfg. Co.:
Model Kitchen Equipment*, Aug 15 p 25

Brinley, Charles E.:
Time for Complacency Is Over, July 18 p 13

British Iron & Steel Corpn.:
Formed to Control Import and Export Trade, Dec 12 p 56

Broaching:
Bullard Roto-Broach for Internal and External Surfaces*, Oct 17 p 34-D

Broaching Machines:
American Tunnel-Type on Cylinder Block Operations*, July 4 p 32
American, for V-8 Cylinder Heads*, Nov 14 p 34
Cincinnati Horizontal Surface in Nash Plant*, Oct 31 p 20
Developments*, Sept 5 p 181
Foote-Burt Vertical for Nash Bearing Caps*, Oct 31 p 18
Oilgear for Main Bearing Pads on Packard Motor Block*, July 25 p 33

Bronze:
Forming and Drawing Die Material*, July 25 p 22
Overlays on Steel, Electric Arc Welding*, July 4 p 22

Brooklyn Technical High School:
St. John X-Ray Service Unit*, Nov 7 p 34

Brooks, Robert T.:
Executive Vice-President, American Institute of Steel Construction, Sept 19 p 45

Brown & Sharpe Mfg. Co.:
Caliper Rule, Stainless Steel*, Dec 5 p 49
Micrometer - Caliper, No. 240RS*, Aug 15 p 38

Brown, R. P.:
Manufacture of Golf Shafts*, Oct 17 p 34-A

Brunner, John:
Heat Treating Rails, New Method*, July 11 p 20

Bryant, Leslie E.:
Plant Modernization (Modernization Contest), Dec 12 p 28

Buckets:
Robins Grab, Special Shell Design*, Aug 15 p 41

Budd Mfg Co., Edward G.:
Mechanical Zig-Zag Welding*, Sept 12 p 29
To Build Eight Stainless Steel Trains, Aug 22 p 42-D

Buick Motor Co.:
Anodizing Alloy Pistons*, Nov 7 p 38
Machining Anolite Pistons*, Oct 31 p 22
Modernization of Forging Department*, Oct 3 p 18

Building Block:
Owens-Illinois Glass, Oct 24 p 80

Buildings, Metal:
Berloy Steel Frame House*, Oct 10 p 86
Hobart All-Steel Arc-Welded House*, Nov 7 p 34
Moto home — Prefabricated Steel Frame House*, Nov 7 p 35
Sheet-Clad House of Tennessee, Coal, Iron & Railroad Co.*, Aug 1 p 38
Steel Frame Copper Houses*, Aug 29 p 25
Steel House of General Houses, Inc.*, Nov 21 p 76

Bullard Co.:
Roto-Broaching Equipment*, Oct 17 p 34-D

Bureau of Public Roads:
Rules for Road and Grade Separation Programs, July 18 p 53

Bureau of Standards:
Carbon Steel Safety Factor Under Shock, Oct 3 p 48

Burt, Clarence R.:
President, Pratt & Whitney Co.* Nov 14 (insert)

Business:
Activity, June, July 25 p 43; July, Sept 5 p 322; Aug, Oct 3 p 84
Government Invasion of Economic Sphere, Sept 19 p 36-G
Recovery, R. E. Flanders Offers Platform for, Oct 10 p 44

Byers Co., A. M.:
To Make Steel Pipe, Aug 15 p 50

C

Cables:
Highway Guard Rail*, Dec 19 p 33
Lincoln Realwear Welding, Oct p 19

Cadmium:
Becomes Rare Metal, Nov 28 p 54-C

Cadmium Plating:
Vs. Zinc Electroplating for Corrosion Resistance, Nov 21 p 36

Calco Iron Pipe Co., Ltd.:
Acquired by American Rolling Mill Co., Oct 17 p 37

Caldwell, Eugene:
Determining Weights of Washers and Disks*, Aug 1 p 18

Caliper Rule:
Brown & Sharpe, Stainless Steel, Dec 5 p 49

Calorizing Co.:
Gas-Fired Furnaces for Calorizing*, Oct 24 p 28

Cameras:
Motion Picture, and Projectors, Finishing*, Aug 15 p 16

Campbell and Grennan:
Control of Cupola Operation*, Dec 19 p 18

Camshafts:
Casting Ford*, Aug 15 p 22

Canada:
Reciprocal Trade Agreement with United States, Nov 21 p 50-B; Dec 5 p 67

Canfield, J. J.:
Copperhead Defects in Porcelain Enamel*, Aug 15 p 30

Cans:
Beer, Aluminum Plated, Nov 14 p 51
Beer, Continental Can Co. Enters Field*, Sept 26 p 194
Beer, Manufacture in National Can Plant*, Nov 28 p 22
Beer, National Can Co. Enters Field*, Sept 26 p 194
Beer, Tin Plate*, July 4 p 28; July 11 p 90
Tin, Industry Center in Illinois, Oct 31 p 49

Canton Foundry & Machine Co.:
Acquired by Hill Clutch Machine & Foundry Co., July 11 p 63

Capital Goods:
Weekly Index of Activity*, July 4 p 64; July 11 p 76; July 18 p 56; July 25 p 52; Aug 1 p 50; Aug 8 p 72; Aug 15 p 60; Aug 22 p 44; Aug 29 p 28; Sept 5 p 278; Sept 12 p 46; Sept 19 p 54; Sept 26 p 154; Oct 3 p 50; Oct 10 p 65; Oct 17 p 34-C; Oct 24 p 58; Oct 31 p 52; Nov 7 p 60; Nov 14 p 53; Nov 21 p 52; Nov 28 p 58; Dec 5 p 69; Dec 12 p 59; Dec 19 p 49; Dec 26 p 39.

Carboloy Co.:
Wheel Dresser, Diamond Impregnated*, Dec 26 p 17-G

Carborundum Co.:
Acquires Hutto Engineering Co., Aug 8 p 54
Fiber Polishing Wheels, Columbian, Nov 21 p 36

Carburizing:
Eutectrol Process in Electric Auto-Lite Plant, Aug 8 p 24

Carnegie-Illinois Steel Corpn.:
Continuous Strip Mill at McDonald*, Dec 19 p 28
Contracts for Plate Mill, Oct 24 p 55
Merger of Carnegie and Illinois Steel Companies, Sept 26 p 150-B
Officers and Personnel, Oct 3 pp 37, 58
To Operate Central Furnaces, Dec 12 p 77

Carnegie Institute of Technology:
Lectures, Metallurgical, Nov 28 p 55

Carnegie Steel Co.;
Cold Finished Bars, Revised Extras, Aug 1 p 71; Aug 8 p 52; Aug 29 p 37
Hot Rolled Steel Bars, Revised Prices and Extras, Sept 5 p 301
Proposed Unification with Illinois Steel Co., Sept 5 p 267; Sept 12 p 35
To Build Wide Plate Mill, Aug 8 p 54; Aug 15 p 47

Cars:
Chesapeake & Ohio Light Weight Hopper*, July 4 p 26
Freight, Installed by Railroads, 10 months, Dec 12 p 52
Freight, Surplus and in Need of Repair, Dec 19 p 82
Light Weight Box, with Welded Cor-ten Steel Body*, July 4 p 27
Rustless Steel Hopper*, Sept 26 p 192

Case Co., J. I.:
Constitutional Rights—Employees' Strike*, July 18 p 29

Case Hardening:
Steel, Soft Spots on*, Dec 12 p 32

Casing:
Smith High-Yield, Aug 1 p 37

Casters:
Standard Truck Steel Forged*, Aug 15 p 39

Casting:
Ford Camshafts*, Aug 15 p 22

Castings, Iron:
Definitions of Steel and, Nov 7 p 25
Plate Roofing*, Sept 12 p 10

Castings, Lead Saucer:
Molding*, Aug 15 p 20

Castings, Steel:
For Golden Gate Bridge Cable Support*, Oct 3 p 29
Locomotive Bed, Machining*, Nov 7 p 26; Nov 21 p 22

Castle & Co., A. M.:
Expansion, Aug 8 p 40

Cemented Carbide Tools:
And Cutter Maintenance*, July 11 p 16
Tungsten, Small Lot Work*, Aug 8 p 20

Central Iron & Steel Co.:
All-Way-Grip Floor Plate, July 4 p 63

Century Electric Co.:
Squirrel Cage Motors for Refrigeration and Air Conditioning*, Aug 15 p 38

Century of Progress:
Skyride Tower Felled by Thermit Mixture*, Oct 24 p 36

Chaillier Patent:
Straight Line Relief for Cutters and Hobs, July 11 p 110

Chairs:
Zerbee Steel Garden*, Oct 3 p 25

Chamber of Commerce of United States:
To Study Federal Taxation, Sept 26 p 152

Chaplet:
Angell, with Cut Shank Serrations*, Aug 15 p 39

Charts:
Determining Weights of Washers and Disks*, Aug 1 p 18
Length of Life of Automobiles*, July 25 p 38

Chesapeake & Ohio Railroad:
Light Weight Hopper Car*, July 4 p 26

Chester, C. M.:
President, National Association of Manufacturers, Dec 19 p 45

Chevrolet Motor Co.:
Conveyorized Tanks for Chrome Plating Die Castings*, Oct 31 p 16
Manufacture of Wire Wheels*, July 11 p 34
Monorail Overhead Conveyors*, Oct 31 p 17
Pouring Record in Gray Iron Foundry*, July 18 p 40
Steel Tank for Carrying Off Poisonous Gases*, July 1: p 52

Chicago Bridge & Iron Works:
Welded Pressure Tanks*, Dec 5 p 43

Chicago Vitreous Enamel Product Co.:
Color Possibilities of Porcelain Enamel*, Dec 5 p 22

Chicago Wheel & Mfg. Co.:
Hand Grinding Tool*, July 4 p 63

Chloride:
Zinc Ammonium, in Modern Galvanizing*, July 18 p 18

Chromium Plate:
Dead Black, Development of, Aug 1 p 24

Chronolog:
For Inspecting Small Automobile Parts*, July 25 p 21

Cincinnati Bickford Tool Co.:
Upright Drilling Machines*, Oct 3 p 35

Cincinnati Milling Machine & Cincinnati Grinders, Inc.:
No. 2 Universal Miller*, Nov 7 p 44
Precision Roll Grinding Machine, Improved*, Sept 12 p 30

Circuit Breaker:
Square D Co.*, Dec 5 p 48

Cleaner:
For Tinned Ware, Oct 24 p 33

Cleaning:
Metal, Here and Abroad*, Sept 26 p 112

Clearing Machine Corpn.:
Crankless Power Press for Large Auto Body Stampings*, Nov 14 p 24

Cleveland Automatic Machine Co.:
Multiple-Spindle Screw Machine, Improved*, July 25 p 35

Cleveland Pneumatic Tool Co.:
Manufacturing Airplane Struts*, Dec 12 p 20

Cleveland Punch & Shear Works:
Trimming Press, 9-F*, Oct 17 p 34-G

Clipper Belt Lacer Co.:
Vise Belt Lacer*, July 25 p 37

Clower, James I.:
Lubrication of Anti-Friction Bearings*, Oct 3 p 14

Clutches:
Cutler-Hammer Magnetic, with Improved Adjustment*, Aug 1 p 35
Niagara Press*, July 18 p 44

Coal Conservation:
Guffey Bill, Aug 8 p 90; Aug 22 p 42; Aug 29 p 31; Sept 5 p 275; Oct 31 p 43; Nov 7 p 49; Nov 14 p 49; Nov 21 p 75; Dec 5 p 56

Coates Machine Co.:
Spring Testing Machine with Pendulum Scale*, July 18 p 45

Coatings:
Copper Lead Strip for Ford Bearings*, Aug 8 p 25
Cromodine for Rust Proofing, Sept 26 p 149; Oct 31 p 34*
Duraspray, Rust Prevention, July 11 p 31
Finishing Motion Picture Cameras and Projectors*, Aug 15 p 16
Granodizing Ford Lamps as Rust Prevention*, July 11 p 33
Metallic Boron Crystals for Metal Finishing, Sept 12 p 29
Starbright Nickel Plating, Oct 24 p 33
Strip with Copper Lead for Ford Rod Bearings*, Aug 8 p 25

Cobaltcrom:
Nitrided Tool Steel*, Sept 26 p 44

Cold Finished Steel Bar Institute:
Satterthwaite, George, Executive-Secretary, Oct 31 p 41

Coleman & Appleby, Ltd.:
Bright Nickel Plating, Oct 24 p 33

Colmony, Inc.:
Sweat-on or Cast-on of Boron for Metal Finishing, Sept 12 p 29

Color:
Jenkins for Valve Purpose Index*, Aug 15 p 39

Colwell, A. T.:
Nitricastiron Cylinder Sleeves*, Dec 19 p 31

Congress of American Industry:
Convention Proceedings, Dec 12 p 38
Convention Program, Nov 28 p 53

Consolidated Ashcroft Hancock Co.:
Flocontrol Valve*, Aug 15 p 39

Construction:
1935 Census Planned, Dec 19 p 13
Residential, July 4 p 94

Contactor:
Electric Controller Line-Arc Magnetic*, Sept 19 p 35

Containers:
Freight, Here and Abroad*, Oct 24 p 24

Continental Can Co.:
Annual Report, Oct 24 p 79
Enters Beer Can Manufacture, July 4 p 66; Sep 26 p 194*
Rise in Industrial Taxes, Dec 19 p 43

Continental Motors Corpn.:
Diesel Engine, Light-Weight Welded 10-Cylinder Radial*, Sept 19 p 30

Control Devices:
Shallcross Steam Boiler Combustion*, Nov 7 p 43
Tagliabue Temperature and Pressure*, Nov 14 p 35
Taylor Re-Set, Aug 15 p 37

Conventions:
American Foundrymen's Association, Aug 29 p 26
American Gear Manufacturers' Association, Oct 24 p 37
American Industry, Dec 12 p 38
American Institute of Mining and Metallurgical Engineers, Iron and Steel Division, Oct 10 p 37
American Institute of Steel Construction, Oct 24 p 48
American Society for Metals, Oct 10 p 28
American Society for Testing Materials*, July 18 p 22
American Society of Mechanical Engineers, July 4 p 184
American Welding Society, Oct 10 p 34
Associated Business Papers, Inc., Dec 12 p 37
Association of Iron and Steel Electrical Engineers, Oct 3 p 39
Congress of American Industry, Dec 12 p 38
Farm Implement Institute, Oct 17 p 41
International Acetylene Association, Nov 21 p 48
National Association of Manufacturers—Congress of
National Association of Sheet Metal Distributors, Oct 31 p 73
National Founders' Association, Nov 28 p 40
National Machine Tool Builders' Association*, Sept 19 p 36-A; Oct 31 p 44
National Metal Congress*, Oct 10 p 24

Conveyors:
American Lurgi Vibrating-Push, for Hot Materials*, Aug 29 p 19
Link-Belt Automatic Mold Elevator and*, Aug 22 p 20
Monorail for Packard Bodies*, Oct 31 p 18

Cooker:
Large Cereal, Stainless Clad Steel*, Dec 26 p 22

Cooling and Heating System:
Modine Combined*, Aug 15 p 40

Copper:
Crystallization of, Oct 10 p 38
Etching Reagents, A. S. T. M, Recommendations, July 18 p 26

Copper Houses, Inc.:
Steel Frame Copper House*, Aug 29 p 25

Copper Lead:
Coating, Strip for Ford Rod Bearings*, Aug 8 p 25

Corrigan, McKinney Steel Co.:
Annual Report, Aug 1 p 48
Merger with Republic Steel Corpn., Aug 8 p 67; Aug 15 p 59; Sept 26 p 147

Corrosion:
After Pickling Major Source of Galvanizer's Dross*, Dec 5 p 30
Cromodizing, Protection Against, Sept 26 p 149; Oct 31 p 34*
Duraspray, Rust Prevention, July 11 p 31
Granodizing Ford Lamps Against*, July 11 p 33
Non-Ferrous Alloys in Pickling Solution, July 18 p 23
Steel Pipe, July 18 p 28
Zinc Electroplating vs. Cadmium Plating, Nov 21 p 36

Costs:
And Profits in Manufacturing Industry, 1914-1933, Aug 1 p 34

Coupling:
Alloy Products Self-Alining*, Nov 21 p 37
Smith & Serrell Laminated Flexpin, Nov 21 p 38

Cowper-Coles, Sherard:
Duraspray, Rust Prevention, July 11 p 31

Cramer, H.:
Composite Rolls, Review of Typical Designs in Use*, Sept 19 p 28

Cranes:
Whiting with Auxiliary Hoist*, Dec 5 p 46

Crockard, Francis H.:
Five Years of Progress in Southern Merchant Pig Iron*, Oct 10 p 40

Cromodine:
Rust-Proofing Hudson Sheet Metal Parts*, Oct 31 p 24
Rust-Proofing Process, Sept 26 p 149; Oct 31 p 34*

Crown Cork & Seal Co.:
Aluminum Plated Beer Cans, Nov 14 p 51

Cupolas:
Control of Operation*, Dec 19 p 18

Cupping Test:
Jovignot Fluid*, July 11 p 32

Curtis, Frank W.:
Fixture Design in Using Carbide Cutting Tools,* Sept 19 p 18
Maintenance of Carbide Milling Cutters,* July 11 p 16

Cutler-Hammer, Inc.:
Magnet Clutch, Improved Adjustment*, Aug 1 p 35

Cut-Off Machines:
Air Reduction Portable Torch Beam*, Nov 14 p 36
Racine Hydraulic*, Nov 21 p 39

Cutters:
Carbide Milling, Maintenance of*, July 11 p 16
Straight-Line Relief, July 11 p 110

Cutting:
And Welding High Chromium Steels*, Nov 21 p 48
Blanking Dies, Oxyacetylene*, Dec 12 p 25
Oxy-Acetylene, Locomotive and Car Parts, Nov 21 p 50-A
Oxy-Acetylene Tests on Steel Plate, Nov 21 p 50

Cutting Gas:
Oxy-Ferrolene, July 11 p 31

Cutting Tools:
Carbide, Fixtures Design Important in Using*, Sept 19 p 18
Cemented Carbide, Sept 19 p 36-C
Metal, Progress, Sept 5 p 60; Sept 12 p 15

Cylinder Sleeves:
Nitricastiron*, Dec 19 p 31

D

Dairae Tools Co.:
Speedmill Attachment*, Aug 15 p 40

Danekind, A. C.:
Keeping an Eye on Equipment Investment*, Sept 5 p 34

d'Arcambal, A. H.:
Metal Cutting Tool Progress*, Sept 5 p 60; Sept 12 p 15

Davenport and Bain:
Aging of Steel, Oct 10 p 31

Davis, E. W.:
Beneficiation of Low-Grade Ores, Nov 14 p 30

Davison Coke & Iron Co.:
To Be Reorganized, Dec 12 p 68

Day and Schmitter:
Speed Increasing Gears, Oct 24 p 38

Dayton Rubber Mfg. Co.:
Oil-Proof V-Belt, Oct 24 p 41

Degreasing Machines*, Sept 26 p 126

De Leeuw, A. L.:
Machine Tools, Present and Future, Sept 5 p 50

Denham, Athel F.:
Making Cone Area-Contact Worm Gears*, Aug 29 p 10

Department of Commerce:
Foreign Trade, Five Months, Aug 8 p 58
Government Purchasing Offices, Aug 8 p 54

Depreciation:
Fallacy Tending to Obstruct Replacement of Obsolete Equipment, Oct 31 p 12

Detroit Electric Furnace Co.:
Furnaces Completely Automatic, Dec 5 p 66

Detroit Testing Machine Co.:
Brinell Hardness Testing Machine*, Oct 17 p 34-F

DeVilbiss Co.:
Flow Gun for Plastics*, Aug 15 p 39
Spraying Machine, Swinging Arm*, Oct 10 p 88

Die Casting Machine:
Reed-Prentice Hydraulic Plunger Type*, Sept 19 p 36

Die Castings:
Automotive*, Nov 7 p 31

Doehler Aluminum Silicon*, Nov 21 p 36
Zinc Alloy, Aging of, Oct 10 p 38

Die Sinking Machine:
Marquette, for Molding Industries*, Oct 24 p 43

Dies:
Blanking, Fabricated Composite*, Dec 12 p 25
Bronze for Forming and Drawing*, July 25 p 22

Diesel Engines:
Continental Welded 10-Cylinder Radial*, Sept 19 p 30

Disks and Washers:
Determining Weights of*, Aug 1 p 18

Dix, E. H.:
Competition Among Metals, Oct 17 p 36

Doehler Die Casting Co.:
Aluminum Silicon Alloy Die Castings*, Nov 21 p 36
Doler-Brass Alloy, Oct 24 p 32

Doler-Brass:
Die Casting Alloy, Oct 24 p 32

Draper, J. L.:
Lubrication of Enclosed Gear Drives, Oct 24 p 39

Dravo-Doyle Co.:
Direct-Fired Unit Heater*, Oct 3 p 31

Dreher and Zaiser:
Bronze as a Forming and Drawing Die Material*, July 25 p 23

Drilling and Tapping Machine:
Kingsbury, with Unit Head Construction*, Oct 24 p 42

Drilling Machines:
Baker Hydraulic Vertical*, Nov 21 p 38
Barnes Hydraulic Ram*, Aug 15 p 36
Black & Decker Junior Portable, Oct 24 p 43
Cincinnati Bickford Upright*, Oct 3 p 35
Developments*, Sept. 5 p 121
Giddings & Lewis Horizontal Precision Boring, Milling and*, Aug 1 p 32
Leland-Gifford for Packard Camshafts*, Oct 31 p 19
Millholland Automatic Indexing*, Oct 10 p 49
Millholland Smoke Hole*, July 4 p 31

Drop Forging Association:
Succeeds American Drop Forge Institute, July 18 p 53

Drosa:
Galvanizer's, Corrosion After Pickling Major Source of*, Dec 5 p 30

Drum:
Six-Sided Revolving, with Westinghouse Motor*, Nov 14 p 32

Drummond, R. S.:
Finishing Gears by Crossed Axes Shaving Process*, July 4 p 18

Dumping:
Foreign Steel, Walsh Bill, Aug 1 p 47; Aug 8 p 67
South African Duty Against American and British Sheets, Nov 28 p 49

Dunbar, Howard W.:
Surface Finishing by Cylindrical Grinding, Sept 19 p 36-B

Duraspray:
Rust Prevention, July 11 p 31

Dust:
Eliminating in Crushing Department of Inland Steel Plant*, Aug 22 p 28
Schneible Multi-Wash Collector*, Nov 7 p 43

E

Earnings:
Financial Incentives Increase, Dec 26 p 45
Steel Industry First Half, Sept 19 p 44

Eastham, John H.:
Molding Tower Lead Saucer Castings*, Aug 15 p 20

Eckman, E. C.:
Welding All-Metal Radio Tubes, Oct 10 p 36

Economics of Mechanization:
Lightning Struck This Plant*, Aug 8 p 27
Turning Minutes Into Gold*, July 11 p 37

Editorials:
Barber Goes New Deal One Better, Nov 28 p 13
Be Case-Hardened but Not Complacent, Aug 22 p 15; Sept 5 p 277
Believe It or Not (Wealth Sharing), Nov 14 p 17
Breathing Spells, Sept 19 p 17
Bulls in China Shops, Nov 7 p 19
Fifteen Thousand Million Dollars, Nov 21 p 17
Hot Weather Briefs, Aug 1 p 11
In Buying Security, Who Pays for What? Oct 24 p 19
Isn't It Silly? (Townsend Plan), Dec 26 p 9
Lamps, New, for Old, Oct 10 p 13
Message to National Metal Congress, Sept 26 p 53
Most Americans Choose to Choose, July 11 p 12
New Deal—Perhaps We are Old Fashioned, July 25 p 17
Potatoes, Are You Interested in? Aug 29 p 9; Sept 12 p 9
Soak the Rich and Smash the Big, July 4 p 11
Security, a Search for, Oct 31 p 11
Taxes, What Are You Willing to Pay? Oct 17 p 15
Time for Complacency Is Over—Address by Charles E. Brinley, July 18 p 13
To Collectors of Little Hoards, Dec 5 p 19
To Keepers of the Pocketbooks, Oct 3 p 13
Wealth, to Share It is to Destroy It, Aug 8 p 11
Where Angels Fear to Tread, Aug 15 p 15
Whip of Political Dominion, Dec 12 p 19
Whose Overcoat Are You Paying For? Dec 19 p 17
Youth Will Be Served, Sept 5 p 80

Ehrnstrom, George, Jr.:
Tin Plate Beer Container*, July 4 p 28; July 11 p 90

Einstein, Sol:
Today's Machine Tool Problems, July 11 p 25

Eisler Engineering Co.:
Combination Welding, Cutting and Trimming Machine*, Sept 12 p 34

Elasticometer:
Coates Spring Tester, with Pendulum Scale*, July 18 p 45

Electric Auto-Lite Co.:
Carburizing Steel Parts by Eutectrol Process*, Aug 8 p 24

Electric Controller & Mfg Co.:
Line-Arc Magnetic Contactor*, Sept 19 p 35

Electric Home and Farm Authority:
Program, Aug 22 p 42

Electrodes:
Budd Device for Zig-Zag Welding*, Sept 12 p 29
Lincoln Stainweld B for Arc Welding, Dec 26 p 17-E

Electro Metallurgical Co.:
Stainless Steel Breakfast Set*, July 25 p 29

Electro-Motive Corpn.:
Diesel Engine Plant*, Aug 8 p 58; Dec 26 p 46

Elevator-Conveyor:
Link-Belt Automatic Mold*, Aug 22 p 20

Elgin, Joliet & Eastern Railway Co.:
Government Loses Case Against, July 11 p 62

Elmes Engineering Works, Charles F.:
Hydraulic Gap Press*, Nov 21 p 37

Emergency Relief Appropriations Act:
Applications for Work Relief Money, July 25 p 49

Emery, James A.:
Address at Congress of American Industry, Dec 12 p 40

Empire Sheet & Tin Plate Co.:
To Enter Tin Plate Field, Dec 5 p 64

Enamel:
Porcelain, Copperhead Defects in*, Aug 15 p 30
Synthetic, for Metal Finishing*, Aug 29 p 22

Engineers:
Registration Required in State of Wisconsin, Sept 19 p 46

Engines:
Diesel, Continental Light-Weight Welded 10-Cylinder Radial*, Sept 19 p 30

Ernst, Hans:
Motion Picture Studies of Chip Removal, Sept 19 p 36-F

Etching Reagents:
A. S. T. M. Recommendations for Iron and Steel, Aluminum and Its Alloys, Copper and Its Alloys, Nickel and Its Alloys, July 18 p 24

Ettco Tool Co.:
Tapping Attachments*, Oct 24 p 41

Eutectrol Process:
Carburizing Steel Parts in Electric Auto-Lite Plant*, Aug 8 p 24

Evaporator:
Arc-Welded Salt*, Nov 21 p 38

Exhibition Advisory Council, Inc.:
Industrial Exhibits for 1936, Dec 19 p 45

Exhibitions:
Alloy Steel, Dec 12 p 55
Cleveland Centennial, 1936, Nov 28 p 55; Dec 5 p 42*
National Machine Tool Builders*, Sept 19 p 36-A; Sept 26 p 150; Oct 31 pp 25, 26
National Metal Congress, Developments of the Year*, Sept 26 p 62
Packaging Announcement, Oct 31 p 77
Purchasing Agent's Association of Pittsburgh, Oct 10 p 39
Recovery Products, Dec 19 p 48

Exports:
Iron and Steel, 10 Months, Dec 12 p 52
Iron and Steel, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; August, Oct 3 p 47; September, Oct 31 p 50; October, Dec 5 p 54
Iron and Steel Five Months, Show Favorable Balance, Aug 8 p 58
Machine Tools, Aug 8 p 26
Scrap, and Principal Buyers, First Half 1934 and 1935, Sept 5 p 322

Extras:
Automobile Spring Steel Revised, Sept 19 p 73
Bars, Cold Finished Revised, Aug 1 p 71; Aug 8 p 52; Aug 29 p 37
Bars, Hot Rolled, Revised Prices and, Sept 5 p 301
Chemicals, Revised for Plates, Sheets and Strip Steel, Aug 22 p 35
Flat Rolled Products, Dec 26 p 61
Forging Billets, Nov 28 p 54-C
Manganese Differentials for Ferrosilicon Iron, July 11 p 75
Roofing, Painted and Galvanized formed, Aug 22 p 50
Skelp, Dec 5 p 80

Extrusion:
Of Steel Shapes*, July 25 p 18

F

Fairbanks Co.:
Plug Type Valve*, July 25 p 37; Aug 15 p 38

Fairless, Benjamin F.:
Honored at Luncheons, Sept 19 p 45

Falk Corpn.:
Group Insurance Program, Oct 31 p 76

Farm Equipment:
Gain in Production, Aug 15 p 51

Farm Implement Institute:
Convention Proceedings, Oct 17 p 41

Federal Housing Administration:
Approves Beam Steel Floors, July 4 p 58

Federal Machine & Welder Co.:
Percussion Welding Machine*, Sept 12 p 27
Spot Welder for Aluminum Alloy Airplane Parts*, Nov 14 p 33

Federal Reserve System:
Financing Business Expansion with 13b Loans, Aug 22 p 26

Federal Trade Commission:
Annual Report—Asks for Broader Control Over Industry, Dec 5 p 59
Asked to Sponsor Trade Practice Agreements, Aug 15 p 48

Feeder:
Packer Automatic for Buffing Compound*, July 25 p 36

Fellows Gear Shaper Co.:
Hourglass Gear Shaper and Worm Lapper*, Oct 3 p 32

Fenders:
Automobile, Flash Welding in Pontiac Plant*, July 11 p 18

Fernico:
Alloy Steel, New, Aug 1 p 45

Ferroalloys:
Production of First Half, Aug 22 p 42-A

Ferrosilicon Iron:
Manganese Extras, July 11 p 75

Ferro-Therm:
Steel Sheet Insulation*, Oct 24 p 34

Filbert, William J.:
Retires as Chairman of Steel Corporation Finance Committee, Dec 19 p 68; Dec 26 p 34* (Insert)

Filter:
Ruemelin Bag Type Air*, Aug 1 p 34

Findley, Alvin A.:
One American Revolution at a Time! Dec 5 p 61

Finney, Burnham:
Granodizing Ford Lamp Shells*, July 11 p 33

Fiske, Rogers A.:
Automatic Lathe for Machining Oil Well Drilling Tool Parts*, July 4 p 30
Color in Porcelain Enamel Wall Finish*, Dec 5 p 22
Constitutional Rights — Case Company Strike*, July 18 p 29

Fixtures:
Benjamin Mercury Vapor Lamp*, Oct 10 p 50
Design in Using Carbide Cutting Tools*, Sept 19 p 18

Flanders, Ralph E.:
New Pioneers on a New Frontier, Dec 5 p 20
Platform for Business Recovery, Oct 10 p 44

Flat Rolled Products:
Extras, Dec 26 p 61

Floors:
Beam Steel Approved by FHA, July 4 p 58
Central All-Way-Grip Floor Plate, July 4 p 63
Rubber Gloss Water Emulsion for, Dec 5 p 44

Flow Gun:
DeVilbiss for Plastics*, Aug 15 p 39

Food Cabinet:
Stainless Steel for White House*, Dec 5 p 41

Foote Gear Works, Inc.:
Speed Reducer, Motorized Worm*, Oct 24 p 40

Forbes, D. P.:
Properties of Malleable Iron, Aug 15 p 50

Ford Motor Co.:
Air Conditioning Machine Shops and Foundry, Aug 22 p 42-B
Appraising Machine Tool Replacement Possibilities*, Sept 5 p 26
Begins Work on New Coke Ovens, Aug 8 p 54
Casting Camshafts*, Aug 15 p 22
Coating Strip with Copper Lead for Rod Bearings*, Aug 8 p 25
Electric Furnaces in Alloy Steel Casting Department*, Oct 31 p 17
Exposition Rotunda*, Dec 5 p 43
Granodizes Lamps for Rust Prevention*, July 11 p 33
Hot Strip and Cold Finishing Mills*, Nov 28 p 19-A
Modernizes Blast Furnaces, Aug 15 p 49
New Sheet Mills Nearing Completion, Aug 22 p 32; Aug 29 p 35; Sept 19 p 46
Welding Operations on Automobiles, Oct 10 p 47

Foreign Trade Zones Board:
Free Zone Rules, July 11 p 58

Foreman:
Safety Responsibility, Oct 24 p 30

Forging Billets:
Extras, Nov 28 p 54-C

Forging Machines:
Acme All-Steel with Cushioned Drive*, Sept 12 p 31

Forgings:
Billet Change Increases Cost of, Oct 10 p 56
Grain Size and Structure Control by Heat Treatment*, Sept 26 p 48
Manufacture in Buick Motor Plant*, Oct 3 p 18

Forming and Stamping Machines:
Developments in*, Sept 5 p 194

Forsythe, W. E.:
Temperature Measurements, Oct 10 p 39

Fosdick Machine Tool Co.:
Safety Overalls*, Dec 26 p 46

Foundries:
Apprenticeship Standards, July 11 p 35
Chevrolet Gray Iron Pouring Record*, July 19 p 40
Cupola Operation, Control of*, Dec 19 p 18

Foundrymen's Associations:
American, Convention Proceedings, Aug 29 p 26; Forms New Chapters in St. Louis, Detroit, Milwaukee and San Francisco Districts, Nov 28 p 56; Plans for Show, Dec 5 p 65; Standards for Foundry Apprenticeship*, July 11 p 35
Northeastern Ohio Chapter, American Foundrymen's Association, Meeting, Nov 21 p 47

France:
Increases Machine Tool Quotas, Oct 10 p 57

Frank Automatic Bending Co., Inc.:
Tube Bending Machine*, July 18 p 44

Frank, Fritz J.:
Honored by Rollins College*, Nov 14 p 45

Franklin Research Co.:
Rubber Gloss Water Emulsion for Floors, Dec 5 p 44

Freight:
Traffic in Steel, First Half, Dec 12 p 55

Freight Containers:
Here and Abroad*, Oct 24 p 24

Freight Rates:
Cast Iron Pipe Reduced, Dec 26 p 36
Central Freight Association and Trunk Line Territories Granted Relief from Short Haul Rates, July 25, p 48
Inland Steel Co. Fights "Switch Rebates," Aug 15 p 51
Iron and Steel in Middle West Not Unlawful, Dec 5 p 58
Toledo Steel Buyers File Brief with American Iron and Steel Institute, Aug 1 p 37
Wire Rods, Proposed, Suspended, Nov 21 p 46

French, H. J.:
Alloy Steels, Application and Handling of Nickel and Other, Oct 31 p 75

French Oil Mill Machinery Co.:
Plastic Molding Press*, Aug 29 p 13

Friend and Leckie:
Industrial Propane for Bright Annealing*, July 25 p 30

Frit:
Hommel Transparent Acid Resisting*, July 11 p 32

Fuels:
Gaseous, A.S.T.M. Committee to Study, Oct 24 p 80

Fuller and Wilcox:
Aging of Zinc Alloy Die Castings, Oct 10 p 38

Funk, Edgar W.:
Metal Finishing, Synthetic Enamel*, Aug 29 p 22

Furnaces, Blast:
American Steel & Wire Co. Dismantling Two, July 25 p 42
Developments in U.S.S.R.*, Aug 1 p 12
Five Years of Progress in Southern Merchant Pig Iron*, Oct 10 p 40
Ford Modernized, Aug 15 p 49
Pig Iron Production, June, July 4 p 67; July, Aug 8 p 71; August, Sept 5 p 277; September, Oct 3 p 48, Oct 10 p 64; October, Nov 7 p 82; November, Dec 5 p 67

Furnaces, Calorizing:
Gas-Fired*, Oct 24 p 28

Furnaces, Electric:
Detroit, Completely Automatic, Dec 5 p 66
For Brazing Metal Radio Tubes*, Dec 26 p 17-F

Furnaces, Gas Fired:
Heat Treating, in International Business Machines Plant*, July 25 p 24

Furnaces, Heating:
Salem Ingot*, Nov 21 p 34

Furnaces, Heat Treating:
For Brake Drums in Ford Plant*, Oct 31 p 21

Furnaces, Open-Hearth:
Non-Metallic Impurities in Steel, Nov 14 p 21

G

Gages:
Developments in*, Sept 5 p 211
Kendall Iron Pipe Size*, Dec 5 p 40
Sensitive Eectric Inspection in Buick Plant*, Oct 31 p 23

Galvanizing:
Dross, Corrosion After Pickling Major Source of*, Dec 5 p 30
Zinc Ammonium in*, July 18 p 18

Gardner Machine Co.:
Horizontal Disk Grinders*, Nov 14 p 35

Gas:
Fuel, for Cutting, Nov 21 p 50

Gassner, T. S.:
85th Anniversary, Aug 15 p 100

Gear Blanks:
Welded Steel*, Nov 14 p 23

Gear Finishing Machine:
Michigan Internal*, Oct 24 p 40

Gear Making Machines:
Developments in*, Sept 5 p 167

Gears:
Checking, Methods for*, July 18 p 14; Aug 1 p 20
Cone Area-Contact Worm, Making*, Aug 29 p 10
Finishing, Sept 26 p 149
Finishing by Crossed Axes Shaving Process*, July 4 p 18
Metallurgy of, Oct 24 p 38
Speed Increasing, Oct 24 p 38
Spiral, Durability of, Oct 24 p 38

Geier Co., P. A.:
Finishing Vacuum Cleaner Parts*, Nov 28 p 34

General Electric Co.:
Earnings Nine Months, Oct 24 p 55
Discontinues Unemployment Compensation, Nov 28 p 55
Giant Plastic Molding Press Installation*, Aug 29 p 13
Keeping an Eye on Machine Tool Investment*, Sept 5 p 20
Metal Radio Tubes Electric-Furnace Brazed*, Dec 26 p 17-F
Organizes Houses, Inc., Aug 1 p 36
Semi-Annual Report, July 25 p 42

General Fireproofing Co.:
Manufacture of Aluminum Furniture*, Nov 28 p 30

General Houses, Inc.:
Steel House*, Nov 21 p 76

General Hydraulic Co.:
Variable Displacement Hydraulic Transmissions*, Nov 28 p 39

General Industries Co.:
Manufacture of Plastics*, Aug 8 p 22

General Motors Corpn.:
Quarterly Report, Aug 1 p 47
To Spend $50,000,000 for Improvements, Aug 15 p 49

General Pipeline Co.:
Electric Welding 89-Mile Pipe Line*, Sept 12 p 24

General Refractories Co.:
Ritex Refractory Process*, Nov 21 p 18

General Steel Castings Corpn.:
Machining Large Locomotive Bed Castings*, Nov 7 p 26; Nov 21 p 22

Generators:
Westinghouse Cross Field Welding*, Dec 5 p 38

Gerken, T. H.:
Week in Washington, Aug 1 p 43

Germany:
Pig Iron and Steel Industry, July 11 p 69; Sept 26 p 188; Oct 31 p 75

Gibb-Lewis Co.:
Organized to Deal in Patents and Patented Articles, Nov 21 p 50-G

Gibson, A. E.:
Welding Low Alloy Steels, Oct 10 p 34

Giddings & Lewis Machine Tool Co.:
Horizontal Precision Boring, Drilling and Milling Machine*, Aug 1 p 32

Gier Co., C. R.:
Machine Vise*, Oct 17 p 34-G

Gil-Boat Co.:
Construction of Pressed Steel Boats*, Aug 1 p 23

Gisholt Machine Co.:
Ram-Type Turret Lathe*, Dec 5 p 44

Glascock Brothers Mfg. Co.:
Metal Working Outfit for Home Use, Dec 5 p 46

Glasner, R. W.:
Crankless Power Press for Large Auto Body Stampings*, Nov 14 p 24

Glass Building Block:
Owens-Illinois Glass Co., Oct 24 p 80

Gleason Works:
Gear Hardening Machine*, Oct 24 p 32

Glenzer Co., J. C.:
Tool Holders, Compensating*, Oct 24 p 43

Golf Shafts:
Manufacture at Plant of American Fork & Hoe Co.*, Oct 17 p 34-A

Goodyear Tire & Rubber Co.:
Vulcanizing Method for Transmission Belts, Aug 1 p 33

Goss, Norman P.:
Radial Asterism-Fibrous Steel Crystals*, Sept 12 p 67

Government:
Payroll, Aug 15 p 100

Graham Paige Motors Corpn.:
Gas Fired Japanning Ovens*, Dec 5 p 34

Grain Size:
Influence on Steel Wire Manufacture*, Oct 10 p 14; Oct 17 p 23
Steel, Influence of Aluminum on*, Oct 10 p 20; Oct 17 p 28

Granite City Steel Co.:
High-Tensile Steel, Oct 24 p 90

Granodizing:
Ford Lamps for Rust Prevention*, July 11 p 33

Graphite:
Nuclei in Solid and Liquid Iron Solutions, Oct 10 p 39

Gray Machine Co.:
Turret Head Nibbling Machines*, Oct 17 p 34-F

Grant, James:
Oxy-Acetylene Cutting, Locomotive and Car Parts, Nov 21 p 50-A

Grasselli Chemical Co.:
Zinc Electroplating vs. Cadmium Plating, Nov 21 p 36

Great Britain:
Freight Containers*, Oct 24 p 24
Plant Modernization, July 4 p 59
Sheffield Steel Industry Expanding, Aug 1 p 88
Steel Production, Sept 19 p 36-F

Greaves-Klusman Tool Co.:
Geared-Head Engine Lathe*, Oct 17 p 34-E

Greaves, Richard H.:
Chromium Steels, Sept 19 p 23

Greek National Bank:
Vault of Impregnable Steel, Nov 14 p 76

Greenerd Arbor Press Co.:
Hydraulic Arbor Press*, Nov 7 p 42

Greninger, Alden B.:
Crystallization of Copper, Oct 10 p 38

Grennan and Campbell:
Control of Cupola Operation*, Dec 19 p 18

Grinding:
Cylindrical, Surface Finishing by, Sept 19 p 36-B

Grinding Machines:
Chicago Hand*, July 4 p 63
Cincinnati Improved Precision Roll*, Sept 12 p 30
Developments, Sept 5 p 101
Gardner Horizontal Disk*, Nov 14 p 35
Hill Clutch Hydraulic Surface and Blade*, Nov 14 p 37
Landis Die Chaser*, July 18 p 42
Mattison High-Power Surface*, Oct 10 p 51
Star Precision Drill*, Dec 5 p 48
Stokerunit for Carbide Tool Work, July 4 p 34
Sunnen Model L*, Nov 7 p 42
Swiss Tool Room Thread*, July 4 p 33
Wesson Cemented-Carbide, with Reversible Motor Drive*, Sept 12 p 33

Grinding Wheels:
And Abrasives for New Cutting Tools, Sept 5 p 235

Grip Lifter:
Shaw-Box for Cranes and Hoists*, Sept 19 p 36

Grob Brothers:
Table Slide for Band Saw Machine, Nov 14 p 36

Guard, Highway:
Cable-Type*, Dec 19 p 33

Guffey Bill:
Coal Nationalization, Aug 8 p 90; Aug 22 p 42; Aug 29 p 31; Sept 5 p 275; Oct 31 p 43; Nov 7 p 49; Nov 14 p 49; Nov 21 p 75; Dec 5 p 58

H

Hacksaws:
Robertson Improved Power Control*, Dec 5 p 47
Rasmussen Power*, Dec 5 p 45

Hadfield, Sir Robert:
Reviews Uses of Alloy Steels, Nov 14 p 51

Hamilton and Beardsley:
Gears, Methods for Checking*, July 18 p 14; Aug 1 p 20

Hamilton, Rolland J.:
Prospects for Building Industry, Dec 12 p 37

Hancock, M. S.:
Cross Field Welding Generator*, Dec 5 p 38

Hanna Engineering Works:
Portable Pneumatic Press*, Oct 17 p 34-G

Hannifin Mfg. Co.:
Air-Operated Platen Press*, Aug 1 p 35
Hydraulic Straightening Press*, July 18 p 42

Hanson - Van Winkle - Munning Co.:
Zam, New Plating Anode, July 11 p 110

Harbison - Walker Refractories Co:.
Quarterly Report, Oct 24 p 79

Hardening:
Surface, Shorterizing Method*, Aug 8 p 12

Hardening Machine:
Gleason Gear*, Oct 24 p 32

Harding, R. L.:
Pre-fabricated Steel Houses, Sept 26 p 150-E

Hardinge Brothers, Inc.:
Tool-Room Milling Machine*, Dec 19 p 34

Hardness:
Testing of Nitrided Steels*, Sept 26 p 22

Harwick and Schilling:
Separation of Hematite by Hysteretic Repulsion, Oct 10 p 39

Hatton, O. P.:
Pressed Metal Industry, Nov 28 p 20; Dec 12 p 34; Dec 26 p 26

Haynes Stellite Co.:
Hard-Faced Punch*, Aug 15 p 36

Heater:
American Electric Air*, Dec 26 p 17-H
Dravo-Doyle Direct-Fired Unit*, Oct 3 p 31

Heating:
Induction, Sept 26 p 149

Heat Treating:
Forgings, Grain Size and Structure Controlled by*, Sept 26 p 48
Parts in International Business Machines Plant*, July 25 p 24
Rails, New Method*, July 11 p 20

Heating Machine:
Taylor-Winfield Electric Resistance*, July 4 p 34

Hedgeland and White:
Gear Finishing, Sept 26 p 149

Heil Co.:
Reduces Truck Body Weight*, Aug 15 p 41

Helwig Mfg. Co.:
Box Strap Shear*, Sept 12 p 34

Hettrick, George W.:
Welding Distortion, Oct 10 p 35

Hibbard, Henry D.:
Open-Hearth Boils, Sept 26 p 98

Highways:
Cable-Type Rail Guard for*, Dec 19 p 33
Rules Governing Grade Separation Work and, July 18 p 53

Hill Clutch Machine & Foundry Co.:
Acquires Canton Foundry & Machine Co., July 11 p 63
Vertical Hydraulic Surface and Blade Grinder*, Nov 14 p 37

Hi-Steel:
Inland Low-Alloy Steel, Dec 19 p 45

Hobart Brothers Co.:
All-Steel Arc Welded House*, Nov 7 p 34

Hobbing Machines:
Barber-Coleman Taper Spline*, Oct 10 p 48

Hobbs, H. G.:
Zinc Ammonium Chloride in Modern Galvanizing*, July 18 p 18

Hoglund, G. O.:
Gas Welding Aluminum and Its Alloys, Nov 21 p 50

Hoist:
Shaw-Box Hand Trolley*, Nov 7 p 43

Holders:
Glenzer Compensating Tool*, Oct 24 p 43

Holmberg, J. C.:
Welding Low Alloy Steel, Oct 10 p 34

Hommel Co., O.:
Transparent Acid-Resisting Frit*, July 11 p 32

Honing Machines:
Developments in*, Sept 5 p 101
Hutto Hydraulic Lapping and*, July 18 p 43

Hook, Ira T.:
Resistance Welding Copper Alloys, Oct 10 p 36

Hoover Co.:
Polishing Electric Appliances*, Sept 12 p 20

Horne, H. F.:
Micarta Bearings, Oil and Grease Lubricated*, Nov 14 p 22

Hortonsphere:
Arc Welded Container for Natural Gas*, Nov 14 p 32

Horvitz and Jack:
Heat Treatment for Grain Size and Structure in Large Forgings*, Sept 26 p 48

Hot Blast Stoves:
Analysis of Design and Construction*, July 4 p 12

Houses:
Berloy Steel-Frame*, Oct 10 p 86
Hobart Brothers All-steel Arc-Welded*, Nov 7 p 34
Motohome—Prefabricated Steel Frame*, Nov 7 p 35
National, Steel Sheet*, Dec 26 p 17-D
Prefabricated Steel, Development of, Sept 26 p 150-E
Sheet Clad, Tennessee Coal, Iron & Railroad*, Aug 1 p 28
Steel-Frame Copper*, Aug 29 p 25
Steel-Frame, Potential Market for, Oct 24 p 49
Steel-Frame Under Construction at Ottawa Hills, Ohio, Oct 10 p 43
Steel, General Houses, Inc.*, Nov 21 p 76

Houses, Inc.:
Organized by General Electric Co., Aug 1 p 36

Hovey, Otis E.:
Use of Steel in Dams, Oct 24 p 50

Howat, John T.:
Gear Metallurgy, Oct 24 p 38

Hruska, John H.:
Hardness Testing of Nitrided Steels*, Sept 26 p 22
Testing Metallurgical Fuel Oils*, Oct 24 p 20

Hubbard, Guy:
Machine Tools, Oct 24 p 26

Hurley, W. B.:
Rust Proofing Process in Budd Wheel Plant, Sept 26 p 149

Hutto Engineering Co.:
Acquired by Carborundum Co., Aug 8 p 54
Hydraulic Honing and Lapping Machine*, July 18 p 43

I

Iden, V. Gilmore:
Secretary American Institute of Steel Construction*, Sept 26 p 150-D

Idler:
Link-Belt Double Belt-Aligning*, Aug 15 p 40

I.J.D. Alloy:
For Acid Resistance, Sept 12 p 29

Illinois Steel Co.:
Heat Treating Rails, New Method*, July 11 p 20
Unification with Carnegie Steel Co., Sept 5 p 267; Sept 12 p 35; Sept 26 p 150-B

Illuminator:
Bausch & Lomb Surface*, Nov 7 p 41

Imhoff, Wallace G.:
Galvanizer's Dross, Corrosion After Pickling Major Source of*, Dec 5 p 30

Imports:
German Steel, Sept 19 p 49
Iron and Steel, May, July 25 p 44; June, Aug 1 p 45, Aug 8 p 56; July, Sept 12 p 36; August, Oct 3 p 47; September, Oct 24 p 57-A, Oct 31 p 50
Iron Ore and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; September, Oct 31 p 50; October, Dec 5 p 54
Manganese Ore and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; September, Oct 31 p 50; October, Dec 5 p 54
Pig Iron, and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; August, Oct 3 p 47; September, Oct 31 p 50; October, Dec 5 p 54
Steel, Full Protection Denied Against Competition on PWA Jobs, Aug 1 p 46
Steel, Five Months, and Employment, July 18 p 48

Induction Heating, Sept 26 p 149

Industrialist and Politics, Dec 12 p 42

Ingersoll Milling Machine Co.:
Openside Boring Machine*, Dec 19 p 35

Ingots, Steel:
Production, June, July 11 p 69; July, Aug 8 p 94; August, Sept 12 p 35; September, Oct 10 p 56; October, Nov 14 p 42; November, Dec 12 p 55
Yield Less Finished Steel Than 30 Years Ago, Aug 1 p 86

Inland Steel Co.:
Eliminating Dust in Crushing Department*, Aug 22 p 28
Hi-Steel, New Low Alloy, Dec 19 p 45
Merger with Joseph T. Ryerson & Son, Inc., Aug 8 p 94; Sept 26 p 150-D
Quarterly Report, Aug 8 p 104

Inspection Equipment:
Chronolog for Small Automobile Parts*, July 25 p 21

Institute of Automobile Engineers: (British):
Jovignot Fluid Cupping Test*, July 11 p 32

Institute of Metals (British):
Annual Meeting Announcement, Aug 1 p 38

Institute of Scrap Iron and Steel:
Convention Program, Dec 26 p 37
Organization Changes, Oct 31 p 40

Insulation:
Ferro-Therm Steel Sheet*, Oct 24 p 34

Insulcrete:
Refractory, New Quigley, Sept 19 p 23

Insurance:
Falk Corpn. Group Program, Oct 31 p 76
Job, Data to be Required of Employers in New York State, Dec 5 p 65
Job, State and Federal Laws, Nov 28 p 19

International Acetylene Association:
Convention Proceedings, Nov 21 p 48

International Business Machines Corpn.:
Heat Treating Parts with Gas Fired Furnace*, July 25 p 24

International Machine Tool Co.:
Uni-Flex Turret Lathes*, Nov 28 p 36

International Nickel Co.:
Quarterly Report, Aug 22 p 42-D

International Tin Research Council:
Cleaner for Tinned Ware, Oct 24 p 33

International Union of Automobile Workers of America:
Organized, Aug 29 p 37; Sept 5 p 299

Iron, Malleable:
Properties of, Aug 15 p 50

Iron-Zinc System:
Zinc Rich Portion of, Oct 10 p 37

J

Jack and Horvitz:
Heat Treatment for Grain Size and Structure in Large Forgings*, Sept 26 p 48

Jacobs, Fred B.:
Piston Production at White Motor Plant*, Aug 22 p 22
Polishing Hoover Electric Appliances*, Sept 12 p 20

James Mfg. Co., D. O.:
Speed Reducer with Top Mounted Motor*, Dec 5 p 47

Jamieson, R. E.:
Residual Stress Effects in Arc-Welded Tension Specimens*, Sept 26 p 78

Janiszewski, K.:
Fabricated Composite Blanking Dies*, Dec 12 p 25

Japan:
Pig Iron and Steel Production, Five Months, Aug 15 p 100

Japanning:
Gas Fired Ovens in Graham Paige Plant*, Dec 5 p 34

Jelliff Mfg. Corpn., C. O.:
Kanthal Alloy, Oct 24 p 32

Jenkins Brothers:
Colors for Valve Wheels*, Aug 15 p 39

Jennings, Charles H.:
Electric Arc Welding Bronze Overlays on Steel*, July 4 p 22

Jessop Steel Co.:
Silverbond, New Composite Stainless Steel Bar Stock, Aug 29 p 57
To Make Mogul Steel, Oct 24 p 54

Jig Borer:
Pratt & Whitney Model 2-A*, Aug 22 p 30

Jointing:
Aluminum Alloys, Aug 1 p 25

Jones & Laughlin Steel Corpn.:
Oil Drill Pipe*, Oct 17 p 44
Quarterly Report, Aug 1 p 48; Oct 24 p 74
Sheet Classifier*, Oct 3 p 26
To Build Wide Continuous Strip Sheet Mill, Dec 19 p 44

Jones, John M.:
Memorial Unveiled, Aug 29 p 51

K

Kanthal:
Electrical-Resistor Alloy, Oct 24 p 32

Kearney & Trecker Corpn.:
Milling Machines, New*, Sept 19 p 34

Keith, Stanley R.:
Identification of Lindbergh Ladder Nails*, Oct 17 p 16

Kempsmith Mfg. Co.:
Sold at Public Auction, Aug 1 p 80

Kendall, A.:
Iron Pipe Size Gage*, Dec 5 p 40

Kent-Owens Machine Co.:
Automatic Milling Machine*, Oct 17 p 34-F

Kerr, H. H.:
Urges Apprentice Training, Oct 24 p 37

Kingsbury Machine Tool Corpn.:
Drilling and Tapping Machines, Unit Head Construction*, Oct 24 p 42

Kinkead, Robert E.:
Welding in Structural Steel Fabricating Shops, Oct 24 p 80

Kirstein, Herman:
Van with Stainless Steel Body*, Nov 7 p 34

Kitchen Equipment:
Briggs Model*, Aug 15 p 25

Klopsch, Otto Z.:
Manufacture of Copper Tubing*, Dec 19 p 24

Knerr, Horace C.:
Nitrided Tool Steels*, Sept 26 p 44

Knox, Frank:
Collectivism in the New Deal, Dec 12 p 37

Knudsen, William S.:
Safety Goes Back to the Foreman, Oct 24 p 30

L

Labor:
Automobile Industry, Older Workers Favored, Nov 7 p 98
Automobile Workers Union Drive to Unionize Automobile Plants, Sept 19 p 36-F
Case Company Employees' Strike — Constitutional Rights and*, July 18 p 29
Correlation of Man-Hours Worked in Steel Industry and Automobile Output, Nov 7 p 102
Earnings, Financial Incentives Increase, Dec 26 p 45
Employee Representation in Steel Industry, July 18 p 48
Employee Representation Vote in Steel Corporation Plants, July 4 p 98
Employee Representation Vote in Weirton Plants, Dec 19 p 73
Employment, Hours and Wages, August, Oct 3 p 48; July, Oct 17 p 54
Falk Group Insurance Program, Oct 31 p 76
General Electric Discontinues Unemployment Compensation, Nov 28 p 55
Hours of Work in Raw Materials of Steel, 1934, Oct 24 p 57-B
Industrial Relations, Address by A. H. Young, Oct 3 p 39
International Automobile Workers Union Organized, Aug 29 p 37
Job Insurance Data to be Required of Employers in New York State, Dec 5 p 65
Job Insurance, Unemployment, State and Federal Laws, Nov 28 p 19
Payrolls in Ohio River Steel Making Districts, 10 Months, Dec 19 p 46
Payrolls Per Dollar of Sheet Steel Sales, 1923-1934, Dec 19 p 45
Safety Overalls in Fosdick Plant*, Dec 26 p 46
Skilled Shortage, Apprentice Training Needed to Supply, July 4 p 29
Unionization Drive Planned for Steel Industry, Nov 28 p 50
United Automobile Workers File Complaint with National Labor Relations Board, Aug 29 p 37
Vocational Rehabilitation in Seaman Body Plant, Aug 15 p 44
Wage Level Changes, World, July 11 p 75
Wage Payments, Premium and Bonus Systems, 1935, July 25 p 84
Wages and Prices, Penalty of Unbalanced, Oct 24 p 57-C
Wagner-Connery Bill and National Labor Policy, July 4 p 61
Wagner-Connery Bill Held Unconstitutional by Committee of Lawyers, Sept 26 p 153
Wagner-Connery Bill Limited by Constitution, July 11 p 60
Wagner-Connery Bill, Regional Boards for Regulation of, Sept 19 p 50
Youngstown Sheet & Tube Plans Vacations with Pay, July 4 p 63

Lacher, G. L.:
Most Americans Choose to Choose, July 11 p 13
To "Share Wealth" Is to Destroy Wealth, Aug 8 p 11
Week in Washington, July 25 p 45

Ladle:
Whiting Ball Bearing*, Nov 28 p 39

Landis Machine Co.:
Die Chaser Grinder*, July 18 p 42
Extension Link for Collapsible Taps*, Aug 1 p 35
Pipe Threading and Machining Attachment*, Oct 10 p 51
Threading Attachment for Double-end Work*, Nov 7 p 44

Lapping Machines.
Developments in*, Sept 5 p 101
Fellows Worm*, Oct 3 p 33
For Packard Transmission Gears*, Oct 31 p 19
Hutto Hydraulic Honing and*, July 18 p 43
Michigan Worm Gear*, Nov 14 p 37

Lathes:
Gisholt Ram-Type Turret*, Dec 5 p 44
Greaves-Klusman Geared-Head*, Oct 17 p 34-E
International Uni-Flex Turret*, Nov 28 p 36
Lehmann Hydratrol*, Aug 22 p 31
Milholland Nos. 5 and 6 Turret*, Sept 12 p 32
Monarch Engine Developments*, Aug 29 p 14
Pratt & Whitney Engine, Type C, 14-16 In.*, Nov 28 p 37
Reed-Prentice Toolroom*, Oct 24 p 42
South Bend 9-In.*, Nov 28 p 36
Springfield Geared Head Engine*, Oct 24 p 43
Sundstrand Automatic, for Machining Oil Well Drilling Tool Parts*, July 4 p 30
Warner & Swasey Improved No. 4 Turret*, Nov 7 p 40

Lead:
Consumption and Other Statistics, 1935, Nov 7 p 58

Leckie and Friend:
Industrial Propane for Bright Annealing*, July 25 p 30

Lee & Sons, Arthur:
New Strip Mill, Oct 24 p 80

Lee Wilson Engineering Co.:
Refinement of Wilson Covers, Aug 8 p 54

Lehmann Machine Co.:
Hydratrol Lathe*, Aug 22 p 31

Lewis Bolt & Nut Co.:
Macer Device, Dec 5 p 47

Lewis, John L.:
Plans Unionization Drive in Steel Industry, Nov 28 p 50

Licensing Bill:
For Industries Engaged in Interstate Commerce, Introduced, Aug 8 p 71

Lifter:
Grip, Shaw-Box*, Sept 19 p 36

Light Waves:
In Precision Measuring*, July 11 p 14

Lincoln Electric Co.:
Special Engine Driven Welding Machine*, Nov 28 p 35

Stainweld B, Arc Welding Electrode, Dec 26 p 17-E
Welding Cable, Realwear, Oct 10 p 19

Lincoln Motor Co.:
V-12 Lincoln-Zephyr Production*, Dec 26 p 17-A

Lind, H. H.:
Impressions of Machine Tool Show, Sept 26 p 150-A

Lind, Lewis M.:
Heads Machinery Division of Department of Commerce, Dec 19 p 41

Lindbergh Ladder Nails:
Identification of*, Oct 17 p 16

Linde Air Products Co.:
Welding Rod for Stainless Steel, Oct 3 p 48

Lining:
Oil Cracking Units with Stainless Alloys*, Nov 21 p 32

Link-Belt Co.:
Automatic Mold Elevator and Conveyor*, Aug 22 p 20
Idler Rolls, Double Belt Alining*, Aug 15 p 40
P.I.V. Variable Speed Transmission*, Dec 26 p 17-H
Shafer Self-Alining Roller Bearing*, Nov 14 p 34

Links:
Landis Extension, for Collapsible Taps*, Aug 1 p 35

Lippert, T. W.:
Late Returns from Laboratory and Mill*, July 11 p 31; Aug 1 p 24; Sept 12 p 28; Oct 24 p 32
Shorterizing, Method of Surface Hardening*, Aug 8 p 12

Loans:
13b, Financing Business Expansion with, Aug 22 p 26
Government to Industry, Business Paper Editors Find Inadequate, Oct 3 p 30

Locomotives:
Installed by Railroads, 10 Months, Dec 12 p 52
Santa Fe's Large Diesel Goes Into Service*, Sept 12 p 37

Logan Co.:
Ball Bearing Assembly*, Dec 26 p 17-E

Lubrication:
Anti-Friction Bearings*, Oct 3 p 14
Enclosed Gear Drives, Oct 24 p 39
United American Bosch Oil and Grease Forced Feed*, Dec 5 p 37

Ludlum Steel Co.:
Option to Acquire Wallingford Steel Co., Sept 5 p 268
Quarterly Report, Nov 7 p 100

Lukens Steel Co.:
Officials and Employees Honored at Community Banquet*, July 11 p 75
125th Anniversary*, July 4 p 35

M

Macer Device:
Lewis, for Bearing Surface Protection, Dec 5 p 47

Machine Tool Congress:
Convention Program, Aug 1 p 92; Aug 22 p 32

Machine Tools:
Appraising Replacement Possibilities*, Sept 5 p 28
Dealer Selling, Sept 5 p 234
Exports, Aug 8 p 26
Keeping an Eye on Your Investment*, Sept 5 p 34
Obsolete, Depreciation Fallacy Tending to Obstruct Replacement, Oct 31 p 12
Orders, June, July 18 p 54; August, Sept 19 p 47
Present and Future, Sept 5 p 50
Today's Problems, July 11 p 25
Tomorrow's Are With Us Today, Oct 24 p 26
Trend of Activities, July 4 p 130; July 11 p 98; July 18 p 88; Aug 1 p 90; Aug 15 p 32; Aug 22 p 66; Oct 24 p 57-D; Nov 21 p 76; Dec 19 p 70

Machinery:
Rebuild Prosperity with Improved, Sept 5 p 20

Machinery and Allied Products Institute:
Favors Self-Regulation of Industry, Nov 21 p 50-H
Opposes Attempts to Revive NRA, Nov 14 p 41

Machining:
Large Locomotive Bed Castings*, Nov 7 p 26; Nov 21 p 22
Operations on Packard One-Twenty Model*, Nov 21 p 30
Selenium Steel for Free, Sept 12 p 28

Mackintosh-Hemphill Co.:
To Reorganize, Oct 17 p 37

MacLeod, Norman D.:
Investment Opportunities at Machine Tool Show, Oct 31 p 25

Macwhyte Co.:
Exhibit of Wire Rope Manufacture*, Nov 14 p 32

Madden, J. Warren:
Limitation of Wagner Bill, Sept 5 p 276

Magnaflux:
For Inspection of Cracks and Seams*, Sept 26 p 40

Magnetic Analysis Corpn.:
Testing Bars and Tubes Magnetically*, Dec 5 p 41

Mahon Spray Booths:
Hydro-Filter for Automobiles*, Oct 31 p 15

Mallory & Co., Inc., P. R.:
Copper Alloy, Mallory 3 Metal, Aug 22 p 34

Marking Machines:
American, with Automatic Feed*, Dec 5 p 49
Quality Hand*, July 25 p 37

Marquette Mechanical Engineering Co.:
Die Sinker for Molding Industries*, Oct 24 p 43

Masterwalls:
In Republic's New York Office*, Sept 19 p 32

Materials Handling:
Moving Plymouth Engines for Shipment*, Oct 31 p 23
Safety Glass in Pontiac Plant*, Oct 31 p 24

Mathews Conveyor Co.:
Strip Steel Turntable, Oct 3 p 31

Mathewson and Seybolt:
Solubility of Oxygen in Cobalt, Oct 10 p 37

Mattison Machine Works:
High-Power Surface Grinder*, Oct 10 p 51

McCall, M. M.:
Billet Peeler*, Sept 19 p 25
Machining Large Locomotive Bed Castings*, Nov 7 p 26; Nov 21 p 22
Niles Billet Gouger Control*, Aug 8 p 18
Threading and Grooving on Vertical Turning and Boring Mills*, Dec 26 p 10

McCarthy, B. L.:
Manufacture of Steel Wire, Influence of Grain Size*, Oct 10 p 14; Oct 17 p 23; Oct 24 p 39

McCarthy, W. F.:
Dealer Selling, Sept 5 p 234

McClintic-Marshall Corpn.:
Bulk Fuel Cylindrical Tanks for River Barges*, Dec 26 p 14

McCollam and Warrick:
Pickle Pitting, Oct 10 p 34

McCune, C. A.:
Awarded Miller Memorial Medal*, Oct 3 p 36

McGranahan, C. L.:
Flat Rolling of Steel, Oct 3 p 75

McGraw Electric Co.:
Stainless Steel Food Cabinet for White House*, Dec 5 p 41

McGuire, O. R.:
Booklet Outlining Federal Contract Rules, Nov 14 p 52

McQuaid, H. W.:
Alloy Steels, Application of, Dec 26 p 18
Aluminum in Modern Commercial Steels*, Oct 10 p 20; Oct 17 p 28

Meacham, J. A.:
Increased Light Values with White Paint*, July 18 p 34

Measuring:
Precision, Light Waves in*, July 11 p 14

Mechanization:
Economics of—Lightning Struck This Plant*, (Modernization Contest), Aug 8 p 27
Economics of—They Did Not Wait for the Lightning (Modernization Contest), Dec 12 p 28
Economics of—Turning Minutes Into Gold*, July 11 p 37

Meison, Everett W.:
Light Waves in Precision Measuring*, July 11 p 14

Mercury Mfg. Co.:
Non-Tilting Coil Lift Hydraulic Truck*, Dec 5 p 48

Mesta Machine Co.:
Pays Christmas Bonus, Dec 26 p 38
Trophy for Best Safety Effort, 1935*, Aug 8 p 67

Metal Finishing:
Motion Picture Cameras and Projectors*, Aug 15 p 16
Polishing Electric Appliances in Hoover Plant*, Sept 12 p 20
Sweat-on or Cast-on of Boron for, Sept 12 p 29
Synthetic Enamel for*, Aug 29 p 22
Vacuum Cleaner Parts*, Nov 28 p 34

Metal Furniture:
Aluminum, Manufacture in General Fireproofing Plant*, Nov 28 p 30

Metal Products Co., I. J. D.:
I.J.D. Alloy for Acid Resistance, Sept 12 p 29

Metal Spray Co.:
Reorganized as Metalspray Co., Inc., Nov 28 p 55

Metal Working Outfit:
Glascock for Home Use, Dec 5 p 46

Metals:
Competition Among, Oct 17 p 36

Meters:
Roots-Connersville Small Size, Dec 5 p 44

Metropolitan Life Insurance Co.:
Training Men for Supervisory Jobs, Dec 26 p 29

Metropolitan Museum of Art:
Stainless Steel Breakfast Set*, July 25 p 29

Metropolitan-Vickers Electrical Co.:
Aluminum Mirrors, Oct 24 p 34

Micarta:
Bearings, Oil and Grease Lubricated*, Nov 14 p 22
Blister-Proof, Nov 7 p 98

Michigan Tool Co.:
Internal Gear Finishing Machine*, Oct 24 p 40
Making Cone Area-Contact Worm Gears*, Aug 29 p 10
Worm Gear Lapping Machine*, Nov 14 p 37

Micrometer Caliper:
Brown & Sharpe No. 240RS*, Aug 15 p 38

Millholland Sales & Machine Co.:
Automatic Indexing Drilling Machine*, Oct 10 p 49
Smoke Hole Drilling Machine*, July 4 p 31
Turret Lathes Nos. 5 and 6*, Sept 12 p 32

Milligan & Wright Co.:
Angstrom Blueprinting Machine*, Aug 15 p 41

Milling Machines:
Cincinnati No. 2 Universal*, Nov 7 p 44
Dalrae Speedmill Attachment for*, Aug 15 p 40
Developments, Sept 5 p 90
Giddings & Lewis Horizontal Precision Boring, Drilling and*, Aug 1 p 32
Hardinge Tool-Room*, Dec 19 p 34
Kearney & Trecker New*, Sept 19 p 34
Kent-Owens Automatic*, Oct 17 p 34-F
Producto Crankshaft*, Dec 19 p 34
Sidney Maximiller*, Oct 3 p 34

Milne & Co., A.:
New England Agents for U. S. S. Alloy Steels, Oct 17 p 36

Milwaukee Metal Spinning Co.:
Spun Injector Sleeve and Stainless Steel Ring*, Dec 5 p 40

Minneapolis Honeywell Regulator Co.:
Optimatic, Optical Pyrometer*, Nov 7 p 41

Mirrors:
Aluminum, Oct 24 p 34

Mitchell, R. W.:
Metal Cleaning Here and Abroad*, Sept 26 p 112

Modernization:
Enforced, Lightning Did Strike This Plant*, (Modernization Contest) Nov 28 p 14
Plant (Modernization Contest), Dec 12 p 28

Modernization Contest:
Prize Winners, Nov 7 p 51

Modine Mfg. Co.:
Combined Cooling and Heating System*, Aug 15 p 40

Moffett, L. W.:
Week in Washington, July 4 p 57; July 11 p 55; July 18 p 50; Aug 8 p 62; Aug 15 p 45; Aug 22 p 39; Aug 29 p 30; Sept. 5 p 273; Sept 12 p 38; Sept 19 p 48; Sept 26 p 150-H; Oct 3 p 40; Oct 10 p 60; Oct 17 p 45; Oct 24 p 50; Oct 31 p 46; Nov 7 p 48; Nov 14 p 46; Nov 21 p 44; Nov 28 p 47; Dec 5 p 56; Dec 12 p 49; Dec 19 p 40; Dec 26 p 33

Mogul Steel:
Jessop Steel Co. to Make, Oct 24 p 54

Mohr and Wille:
Hot Blast Stoves, Analysis of Design and Construction*, July 4 p 12

Molco Process:
Neutralizing Acids in Pickling, July 11 p 32

Molding:
Tower Lead Saucer Castings*, Aug 15 p 20

Moline Tool Co.:
Boring Machine, Hydraulic*, July 25 p 35

Moll & Co.:
Molco Process of Neutralizing Acids in Pickling, July 11 p 32

Monarch Machine Tool Co.:
Engine Lathe Developments*, Aug 29 p 14

Motion Pictures:
Republic Steel Corpn., Stainless Steel, Nov 7 p 96
Studies of Chip Removal, Sept 19 p 36-F

Motohome:
Prefabricated Steel-Frame House*, Nov 7 p 35

Motok and Waltz:
Determination of Aluminum and Alumina in Steels, Dec 26 p 23

Motor Block:
Packard, Broaching Main Bearing Pads on*, July 25 p 33

Motor Carrier Act:
Interstate Commerce Commission to Administer, Aug 15 p 59

Motor Products Corpn.:
Labor Troubles, Nov 28 p 54-A

Motors:
Century Squirrel Cage for Refrigeration and Air-Conditioning*, Aug 15 p 38
Outboard, Aluminum Silicon Die Casting*, Nov 21 p 36

Moulton, Harold G.:
Address at Congress of American Industry Dec 12 p 41

Mumetal:
New Alloy Steel, Sept 5 p 294

N

Nails:
Identification in Lindbergh Ladder*, Oct 17 p 16

National Acme Co.:
Inspecting Small Automobile Parts*, July 25 p 21

National Association of Manufacturers:
Congress of American Industry, Convention Proceedings, Dec 12 p 38
Convention Program, Nov 28 p 53
Officers, Dec 19 p 45
Opposes Graduated Corporation Tax, July 4 p 51
Opposes Restriction on Production, Nov 28 p 53

National Association of Sheet Metal Distributers:
Annual Meeting, Oct 31 p 73

National Can Co.:
Manufacture of Beer Cans*, Sept 26 p 194; Nov 28 p 22

National Conference of Business Paper Editors:
Guide to Applicants for Direct Loan, Nov 21 p 50-E

National Foreign Trade Council:
To Organize Economic Mission to Latin America, Nov 21 p 53

National Founders' Association:
Convention Proceedings, Nov 28 p 40
Standards for Foundry Apprenticeship, July 11 p 35

National Houses, Inc.:
Steel Sheet House*, Dec 26 p 17-D

National Industrial Conference Board:
Apprentice Training Needed to Supply Skilled Labor Shortage, July 4 p 29
Business Activity, June, July 25 p 43; July, Sept 5 p 322; August, Oct 3 p 84
Changes in World Wage Levels, July 11 p 75
Costs and Profits in Manufacturing Industry, 1914-1933, Aug 1 p 84
Earnings, Financial Incentives Increase, Dec 26 p 45
Employment, Hours and Wages, August, Oct 3 p 48; July, Oct 17 p 54
Premium and Bonus Systems of Wage Payments 1935, July 25 p 84
Sales Tax, Survey of States, July 11 p 71
World Industrial Production, May, July 18 p 32; June, Aug 15 p 49; July, Oct 3 p 64

National Labor Relations Board:
United Automobile Workers File Complaint, Aug 29 p 37

National Machine Tool Builders Association:
Convention Proceedings, Oct 31 p 44
Exposition*, Sept 19 p 36-A; Sept 26 p 150; Oct 31 pp 25, 26
Machine Tool Orders, June, July 18 p 54; August, Sept 19 p 47

National Machinery Co.:
Wins Patent Infringement Suit Against Ajax Mfg. Co., July 25 p 69

National Metal Congress:
Convention Proceedings and Exposition*, Oct 10 p 28

National Recovery Administration:
Diversified Studies May Be Basis for New Legislation, Sept 19 p 51; Oct 17 p 48
Division of Review Asks Steel Producers for Data to Make Study, Oct 24 p 53
Fact Finding Board, July 4 p 59
President Orders End of, Dec 26 p 61

National Refractories Co., Inc.:
Organized, Oct 17 p 37

National Safety Council:
Safety Contest Winners, Oct 31 p 75

National Steel Corpn.:
Quarterly Report, Aug 15 p 92; Nov 7 p 82

National Steel Labor Board:
To Be Continued, July 4 p 98

Navy Department:
Solders All Tubing, July 11 p 32
Steel Awards, Nov 14 p 49; Nov 21 p 46
Steel Tonnage Requirements for 13 Vessels, Aug 8 p 67

Nealey, J. B.:
Gas-Fired Calorizing Furnace*, Oct 24 p 29
Gas-Fired Japanning Ovens*, Dec 5 p 34
Heat Treating Parts in International Business Machines Plant*, July 25 p 24

Neff, Kolbusch & Bissell:
Precision Band Saw with Internal Filer*, Nov 28 p 39

Netherlands:
Reciprocal Tariff Agreement with United States, Dec 26 p 36

New Britain-Gridley Machine Co.:
Multiple Spindle Screw Machine Unit Design*, Aug 1 p 28

New Deal:
Collectivism in, Dec 12 p 37

Niagara Machine & Tool Works:
Inclinable Press*, Oct 17 p 34-D
Press Clutch*, July 18 p 44
Squaring Shears for 16-Gage Metal*, Dec 5 p 47

Nibbling Machines:
Gray Turret-Head*, Oct 17 p 34-F

Nickel:
Etching Reagents, A. S. T. M. Recommendations, July 18 p 24

Nickel Steel:
In Mining Operations, Nov 28 p 83

Niles Rolling Mill Co.:
Modernization of Sheet Mill*, Aug 15 p 26; Dec 19 p 42

Niles Tool Works Co.:
Billet Gouger*, Aug 8 p 18
Billet Peeler*, Sept 19 p 25

Nitricastiron:
Cylinder Sleeves of*, Dec 19 p 31

Norbury, A. L.:
Cast Iron and Steel Definitions, Nov 7 p 25

Norma-Hoffmann Bearings Corpn.:
GreaSeal Ball Bearings*, Dec 26 p 17-H

North East Coast Metal Sprayers, Ltd.:
New British Organization, Nov 14 p 44

Norton Co.:
Abrasives and Grinding Wheels for New Cutting Tools, Sept 5 p 235
Sales Department Changes, July 4 p 53

Norton, Paul T., Jr.:
Depreciation Fallacy, Oct 31 p 12

Norway:
Iron and Steel Metallurgy in, Oct 10 p 38

O

Obituary:
Andrus, Elmer D., Oct 10 p 72
Anthony, James Y., Aug 29 p 51
Arnold, Frederick J., Sept 12 p 41
Asbury, C. W., Nov 14 p 46
Bahmann, Richard, Aug 15 p 82
Barton, Francis M., Aug 29 p 51
Bath, John, July 25 p 50
Batzell, A. Edwin, Nov 28 p 54-D
Bean, Ashton G., Aug 1 p 73
Benesch, Ignatz, Oct 17 p 69
Bennett, Mrs. Myrtle S., Oct 3 p 67
Bentz, William T., Oct 31 p 69
Bialosy, Samuel J., Dec 19 p 48
Blagden, Edward R., Sept 19 p 47
Bournonville, Eugene, Nov 14 p 46
Bowman, A. Winfred, Nov 14 p 46
Brigham, Edmund D., Aug 29 p 51
Brooks, Thomas W., Sept 26 p 150-G; Oct 3 p 67*
Brunck, A. F., Oct 3 p 67
Buhl, Arthur H., Sr., Oct 3 p 67
Burgham, Maurice L., Aug 1 p 72
Cary, Herbert L., Aug 1 p 73
Caughey, Edward G., July 4 p 62
Champion, David J.*, Sept 19 p 46
Chaney, Cassius C., Dec 5 p 60
Chelstrom, Robert, Oct 31 p 69
Child, W. A., Oct 24 p 57-A
Connet, Frederick N., July 4 p 62
Conrow, Robert W., Aug 22 p 42-D
Crounse, William L., Nov 28 p 54-D
Doyle, Nicholas A., Sept 19 p 46
Dyer, A. Y., Aug 22 p 42-D
Evans, Alva L., Nov 21 p 50-G
Fahrney, E. Homer, Oct 17 p 69
Fay Joseph F., Aug 29 p 51
Fell, Charles, Sept 19 p 46
Fluegger, John H., Oct 17 p 69
Fownes, H. C., Oct 3 p 67
Gates, William, Aug 15 p 82
Geddes, James R, Nov 21 p 50-G
Gier, Carl R., Oct 17 p 69
Gillespie, J. S., Oct 17 p 69
Gillette, Harry, July 25 p 50
Goodrich, Edward W., July 25 p 50
Guthrie, Seymour, Sr., Nov 14 p 46
Hall, Jay H., Aug 29 p 51
Hamacheck, Frank, Sr., July 25 p 50
Hammond Horace, Nov 14 p 46
Hampson, Henry S., Nov 21 p 50-G
Hanks, Hubert F., Aug 29 p 51
Hatch, Frank A.*, Oct 24 p 57-A
Hauk, Cloyde, Dec 19 p 48
Heer, Charles G., Aug 1 p 72
Herron, William A., Nov 14 p 46
Hill, R. L., Dec 12 p 82
Hirschberg, Ernest S., Nov 14 p 46
Hooker, Leslie E., Dec 5 p 60
Hoyt, Thatcher, Oct 24 p 57-A
Hughes, Alfred R., Sept 26 p 150-G
Hunter, William H.*, Sept 19 p 46
Illig, Edward S., July 25 p 50
Ivy, Paul, Sr., Aug 22 p 42-D
Jeffrey, Charles T., Nov 14 p 46
Johnson, B. H.*, Aug 29 p 51
Johnson, Elias M., Aug 22 p 42-D
Jones, James H., July 4 p 62
Junggren, Oscar, Oct 10 p 72
Kalman, Paul J., Aug 15 p 82
Keenan, Henry C., Sept 26 p 150-G
Kenkel, Julius F., Aug 22 p 42-D
Kilgore, Robert M., Aug 15 p 82
Klingelhofer, John O., July 25 p 50
Krentz, Peter J., Aug 29 p 51
Lehman, Albert C.*, Aug 1 p 72
Lepinsky, Emil, Dec 19 p 48
Lindgren, Emil E., July 4 p 62
Little, Dr. A. D., Aug 15 p 82
Longenecker, Albert R., Oct 31 p 69
MacDonald, Robert L.*, Dec 12 p 82
Malone, John C., Nov 14 p 46
Marsh, John W., Sept 19 p 46
McNamara, F. X. L., July 25 p 50
McQuillan, Joseph W., Nov 14 p 46
Miller, John J., Dec 5 p 60
Morgan, John R., July 25 p 50
Morton, Albert H., Nov 28 p 54-D
Muir, Thomas J., Aug 22 p 42-D
Near, Wallace W., July 25 p 50
Newcomb, Frederick F., Nov 21 p 50-G
Newman, J. F., July 25 p 50
Osborn, Irwin S., Nov 14 p 46

Osborne, Don M., Aug 29 p 51
Player, Samuel P., Nov 21 p 50-G
Poole, Robert L., Nov 14 p 46
Powell, William H., July 25 p 50
Power, Charles M., Oct 24 p 57-A
Ranney, William E., July 4 p 62
Read, William C.*, Nov 21 p 50-G
Remick, Royal C., July 25 p 50
Rice, Edwin W., Jr.*, Nov 28 p 54-D
Robinson, John D., Oct 24 p 57-A
Robison, Frank J., Dec 12 p 82
Root, Marie, Oct 10 p 72
Rubie, Joseph S., Sept 12 p 41
Russell, W. S., Aug 22 p 42-D
Sanford, William H., Sept 26 p 150-G
Schiller, William B.*, Aug 1 p 72
Sedgwick, Earl P., Sept 19 p 47
Seefeld, Clarence A., Nov 14 p 46
Seitz, J. J., July 25 p 50
Shafer, Arthur A., Nov 21 p 50-G
Shafer, Oscar J., Aug 15 p 82
Shore, Frederick R., Dec 12 p 82
Sinyard, James L., July 25 p 50
Smith, Fred B., Sept 12 p 41
Smith, Leo G., Nov 14 p 46
Smith, Robert L., Aug 29 p 51
Snelling, Rodman P., Aug 29 p 51
Snyder, W. T., July 4 p 62
Stitt, Harry E., Aug 29 p 51
Stone, George C., Nov 21 p 50-G
Storrs, Herbert E., July 4, p 62
Streine, Frank H., July 4 p 62
Swigert, Charles F., July 4 p 62
Thorne, Charles, Aug 15 p 82
Tillman, John R.*, Sept 26 p 150-G
Turner, Robert T., Nov 28 p 54-D
Van Doren, John E., July 4, p 62
Varick, Thomas R., Aug 1 p 73
Wells, Frank E., July 4 p 62
Whitcraft, Arthur, Sept 26 p 150-G
White, George L., Oct 17 p 69
Whitmore, Leonard W., Aug 15 p 82
Whitney, Edwin H., Dec 12 p 82
Wick, Philip, Oct 24 p 57-A
Williams, Arthur F., Aug 29 p 51
Wortley, G. S., Oct 24 p 57-A
Young, Charles B., July 25 p 50
Young, John M., Dec 19 p 48
Zinn, Richard P., Aug 1 p 73

Obsolescence:
Machine Tools, Depreciation Fallacy Tending to Obstruct Replacement, Oct 31 p 12

Oil Cracking Units:
With Stainless Alloy Lining*, Nov 21 p 32

Oilgear Co.:
Broaching Machine for Main Bearing Pads on Packard Motor Block*, July 25 p 33

Oils:
Fuel, Steiner Viscometer for Testing*, Oct 24

Oliver, E. W.:
Length of Life of Automobiles*, July 25 p 38

Omnibus Bridge Bill, Aug 15 p 47

Optimatic:
Minneapolis - Honeywell Pyrometer*, Nov 7 p 41

Ore, Hematite:
Separation by Hysteretic Repulsion, Oct 10 p 39

Ore, Iron:
Beneficiation of Low-Grade, Nov 20 p 30
Imports and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; October, Dec 5 p 54
Lake Superior Shipments by Water, 1935, Dec 5 p 64

Ore, Manganese:
Imports and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; October, Dec 5 p 54

Oster-Williams Co.:
Bolt Threading Machine*, Oct 3 p 35

Owens-Illinois Glass Co.:
Glass Building Block, Oct 24 p 80

Oxy-Ferrolene:
New Cutting Gas, July 11 p 31

Oxygen:
Solubility in Solid Cobalt, Oct 10 p 37

P

Packaging Machinery:
Makers Plan Exposition, Oct 31 p 77

Packard Motor Car Co.:
Barber-Colman Machine for Countershaft Gear Teeth*, Oct 31 p 21
Broaching Main Bearing Pads on Motor Block*, July 25 p 33
Machining Operations on One-Twenty Model*, Nov 21 p 30

Packer Machine Co.:
Automatic Feeder for Buffing Compound*, July 25 p 36

Page Steel & Wire Co.:
Tennis Net of Allegheny Stainless Steel*, Dec 12 p 31

Paint:
White, Increased Light Values with*, July 18 p 34

Paint Stripe Guns:
Ryan, Used on Chrysler Cars*, Dec 5 p 43

Palmer and Smith:
Copper Alloys, Thermal and Electrical Conductivities, Oct 10 p 38

Pangborn, T. W.:
President, Pangborn Corpn.*, Nov 28 Insert

Payrolls:
Government, Aug 15 p 100
In Ohio River Steel Making Districts, 10 Months, Dec 19 p 46
Labor's Share of Sheet Steel Sales, 1923-1934, Dec 19 p 45

Phillips, Brick and Smith:
Quenching Stresses and Precipitation Reaction in Aluminum - Magnesium Alloys, Oct 10 p 37

Phillips, J. T.:
Distortion of Seams in Welded Pressure Vessels, Oct 10 p 35

Pickering and Ruckner:
Penalty of Unbalanced Wages and Prices, Oct 24 p 57-C

Pickling:
Molco Process of Neutralizing Acids in, July 11 p 32
Pitting of Steel, Oct 10 p 34

Pig Iron:
Imports and Sources of Supply, May, July 25 p 44; June, Aug 8 p 56; July, Sept 12 p 36; August, Oct 3 p 47; September, Oct 31 p 50; October, Dec 5 p 54
Merchant, a Quality Product, Nov 28 p 29
Merchant, Southern, Five Years of Progress*, Oct 10 p 40
Production First Half, Aug 22 p 42-A
Production, June, July 4 p 67; July, Aug 8 p 71; August, Sept 5 p 277; September, Oct 3 p 48, Oct 10 p 64; October, Nov 7 p 82; November, Dec 5 p 67
Qualities of, Oct 10 p 39

Piling, Steel:
German Purchase for Triborough Bridge Assailed, Nov 14 p 50
New Applications, Oct 24 p 57-C
Reinforcing Trinity Church with, July 4 p 184

Pioneers, New, on a New Frontier, Dec 5 p 20

Pipe:
Jones & Laughlin Oil Drill*, Oct 17 p 44
Prices, Reading Company Reaffirms Resale, Aug 1 p 73
Smith High-Yield Casing, Aug 1 p 37
Steel, Corrosion of, July 18 p 28
Steel, Byers Company to Make, Aug 15 p 50
Steel, Electric Welding 89-Mile Line*, Sept 12 p 24

Pipe-Threading Attachment:
Landis Machining and*, Oct 10 p 51

Pistons:
Alloy, Anodizing in Buick Plant*, Nov 7 p 38
Manufacture in White Motor Plant*, Aug 22 p 22

Planers:
Developments in*, Sept 5 p 181

Plastics:
Manufacture in General Industries Plant*, Aug 8 p 22

Plating Equipment:
Udylite Handiplater*, Aug 15 p 38

Plinke, G. W.:
Gas Welded Pressure Vessels, Nov 21 p 50-A

Polishing:
Electric Appliances in Hoover Plant*, Sept 12 p 20

Polishing Wheels:
Carborundum Columbian Fiber, Nov 21 p 36

Politics and the Industrialist, Dec 12 p 42

Pollack, H.:
Chromium Plate, Development of Dead Black, Aug 1 p 24

Pontiac Motor Co.:
Continuous Tube Mill*, July 11 p 34
Flash Welding Fenders*, July 11 p 18

Porcelain Enamel:
Color, Wall Finish in New Laboratories*, Dec 5 p 22
Copperhead Defects in*, Aug 15 p 30

Pouch, W. H.:
How to Finance Business Expansion with 13b Loans, Aug 22 p 26

Pratt & Whitney Co.:
Burt, Clarence C., President*, Nov 14 (Insert)
Engine Lathe, Type C, 14-16-In.*, Nov 28 p 37
Jig Borer, Model 2-A*, Aug 22 p 30
Reamer, Adjustable Blade*, Oct 24 p 41
Tilting Rotary Table*, Sept 12 p 33

Prentiss, F. L.:
Finishing Vacuum Cleaner Parts*, Nov 28 p 34
Inspecting Small Automobile Parts in National Acme Plant*, July 25 p 21
Manufacture of Plastics in General Industries Plant*, Aug 8 p 22
Manufacturing Airplane Struts*, Dec 12 p 20
Modernization of Niles Sheet Mill*, Aug 15 p 26

Pressed Metal:
Industry, Development in, Nov 28 p 20; Dec 12 p 34; Dec 26 p 26

Presses:
Bliss High-Production*, Sept 19 p 33
Bliss Pedestal Mounted High-Speed*, Dec 5 p 45
Clearing Crankless, for Large Auto Body Stampings*, Nov 14 p 24
Cleveland Trimming, 9-F*, Oct 17 p 34-G
Developments in*, Sept 5 p 194
Elmes Hydraulic Gap*, Nov 21 p 37
French Giant Plastic Molding*, Aug 29 p 13
Greenerd Hydraulic Arbor*, Nov 7 p 42
Hamilton 900-Ton, for Hudson Car Roof Panel*, Oct 31 p 16
Hanna Portable Pneumatic*, Oct 17 p 34-G
Hannifin Air-Operated Platen*, Aug 5 p 35
Hannifin Hydraulic Straightening*, July 18 p 42
Niagara Inclinable*, Oct 17 p 34-D
Quickwork Welded Steel Frames*, July 25 p 35
Schatz Multi-Tool Punch*, Oct 17 p 34-E
Toledo Punch, Streamlined and Strengthened*, July 4 p 34
Toledo Straight Column*, Nov 21 p 38
Waterbury Farrel Continuous Transfer*, Nov 21 p 39
Waterbury Farrel Bench Power*, Sept 19 p 36
Whitney Small Welded Punch*, Sept 12 p 34
Wood HydroLectric*, Nov 14 p 35; Dec 26 p 17-H

Pressure Vessels:
Gas Welding, Nov 21 p 50-A

Price, H. C.:
Pipe Welding Throughout Dust Storms*, July 4 p 21

Prices:
And Unbalanced Wages, Penalty of, Oct 24 p 57-C
Automobile Spring Steel Revised Extras, Sept 19 p 73
Bars, Cold Finished, Revised Extras and, Aug 1 p 71; Aug 8 p 52; Aug 29 p 37
Bars, Hot Rolled, Revised Extras and, Sept 5 p 301
Chemical Extras for Plates, Sheets and Strip Steel, Aug 22 p 35
Flat Rolled Products, Extras, Dec 26 p 61
Forging Billets, Extras, Nov 28 p 54-C
Painted and Galvanized Formed Roofing, Extras, Aug 22 p 50
Pipe, Resale, Reading Company Reaffirms, Aug 1 p 73
Sheet Steel and Automobile, Nov 7 p 33
Skelp, Extras, Dec 5 p 80
Wire Products, Revised Method of Quoting, Aug 22 p 42-C

Priestley, W. J.:
Welding and Cutting High Chromium Steels, Nov 21 p 48

Production:
First Aids to*, Sept 5 p 229
World Industrial, May, July 25 p 32; June, Aug 15 p 49; July, Oct 3 p 64

Production Statistics:
Ferroalloys First Half, Aug 22 p 42-A
Pig Iron First Half, Aug 22 p 42-A
Steel, First Half, Analysis of, Oct 3 p 94
Steel Ingots, June, July 11 p 69; July, Aug 8 p 94; August, Sept 12 p 35; September, Oct 10 p 56; October, Nov 14 p 42; November, Dec 12 p 55

Steel in Mahoning and Shenango Valleys, 1934, Aug 15 p 85
Steel Products for Sale in Second Quarter and First Half, Aug 29 p 61; Third Quarter, Nov 21 p 51

Producto Machine Co.:
Crankshaft Milling Machine*, Dec 19 p 34

Profits:
And Costs in Manufacturing Industry, 1914-1933, Aug 1 p 84

Propane:
Industrial, for Bright Annealing*, July 25 p 30

Prosser, Roger:
Cemented Carbide Cutting Tools, Sept 19 p 36-C

Public Works Administration:
Allocation of Funds for State Roads and Grade Separation, Aug 8 p 104
Allotments, Sept 12 p 40
Denies Full Protection Against Foreign Competition on Jobs, Aug 1 p 46
Raises Differential Allowing for Purchase of Foreign Steel, Nov 21 p 46; Dec 5 p 58
Slum Clearance Projects, Oct 24 p 54

Pull-Lift Devices:
Yale & Towne*, July 25 p 36

Pullman-Standard Car Mfg. Co.:
Light Weight Box Car with Welded High-Tensile Steel Body*, July 4 p 27

Punch:
Haynes Hard-Faced*, Aug 15 p 36

Purchasing Agent's Association of Pittsburgh:
Industrial Exhibit, Oct 10 p 39

Pyrometer:
Minneaapolis - Honeywell Automatic Optical*, Nov 7 p 41

Q

Quality Die Co.:
Hand Marking Machines*, July 25 p 37

Quickwork Co.:
Welded Steel Press Frames*, July 25 p 35

Quigley Co., Inc.:
Insulcrete, New Refractory, Sept 19 p 23

R

Racine Tool & Machine Co.:
Hydraulic Cut-Off Machine*, Nov 21 p 39

Radio Tubes:
Metal, Electric-Furnace Brazed*, Dec 26 p 17-F

Railroad Credit Corpn.:
Liquidating Distributions, Dec 12 p 96

Railroads:
Cars and Locomotives, Surplus, and in Need of Repairs, Dec 19 p 82
Chesapeake & Ohio Light Weight Hopper Car*, July 4 p 26
Freight Cars and Locomotives Installed, 10 Months, Dec 12 p 52
New Line Construction, 1935, Dec 12 p 94
RFC to Loan for Streamlined Trains, Aug 22 p 42
Santa Fe's Large Diesel Locomotive Goes Into Service*, Sept 12 p 37

Rails:
Heat Treating, New Method*, July 11 p 20

Rasmussen Machine Co.:
Power Hacksaw*, Dec 5 p 46

RCA Mfg. Co., Inc.:
Brazing Metal Radio Tubes by Electric Furnace*, Dec 26 p 17-F

Reading Iron Co.:
Reaffirms Resale Pipe Prices, Aug 1 p 73

Reamer:
Pratt & Whitney Adjustable Blade*, Oct 24 p 41

Reconstruction Finance Corpn.:
To Make Loans for Streamlined Trains, Aug 22 p 42

Reed-Prentice Corpn.:
Die Casting Machine, Hydraulic Plunger*, Sept 19 p 36
Toolroom Lathe*, Oct 24 p 42

Reel:
Wittek Coil, with Automatic Arm Control*, Dec 5 p 49

Reflectors:
Mercury Vapor Lamp, Benjamin*, Oct 10 p 50

Refractories:
Insulcrete, New Quigley, Sept 19 p 23
Processes and Materials, Recent Developments*, Nov 21 p 18; Dec 5 p 26

Regulator:
Air Reduction Heavy-Duty Two-Stage*, Dec 26 p 17-G

Republic Steel Corpn.:
Accident Record of Buffalo Plant, July 11 p 63
Acquires Control of Truscon Steel Co., Oct 24 p 79
Board of Directors, Changes in, Sept 19 p 73; Oct 17 p 69
Merger with Corrigan, McKinney Steel Co., Aug 8 p 67; Aug 15 p 59; Sept 26 p 147
Personnel Changes*, Aug 29 p 38; Oct 3 p 73
Quarterly Report, Aug 1 p 48; Oct 31 p 42
Receives Advertising Prize, Oct 3 p 37
Steel Walls in New York Office*, Sept 19 p 32
Sound Picture on Stainless Steel, Nov 7 p 96
Tableware Made of Stainless Steel*, Dec 19 p 58
To Modernize Canton Sheet Mills, Aug 1 p 37
To Remove General Offices to Cleveland, Oct 10 p 59; Oct 17 p 44

Revolution:
American, One at a Time! Dec 5 p 61

Ritex Process:
For Refractory Brick*, Nov 21 p 18; Dec 5 p 26

Robertson Machine & Foundry Co., W.:
No. 2 Power Hacksaw, Improved Control*, Dec 5 p 47

Robins Conveying Belt Co.:
Grab Buckets, Special Shell Design*, Aug 15 p 41

Rockwell Products Co.:
To Establish Plant at Hartford, Conn., Aug 1 p 80

Rodda, Truesdale and Wilcox:
Zinc-Rich Portion of Iron-Zinc System, Oct 10 p 37

Rolling Mills:
Bethlehem to Start New Lackawanna Hot Strip, Dec 5 p 77
Carnegie - Illinois Continuous Strip*, Dec 19 p 28
Carnegie Steel Co. to Build Wide Plate, Aug 8 p 54; Aug 15 p 47
Ford Hot Strip and Cold Finishing*, Nov 28 p 19-A
Ford New Sheet Nearing Completion, Aug 22 p 32; Aug 29 p 35; Sept 19 p 46
Jones & Laughlin to Build Wide Continuous Strip Sheet, Dec 19 p 44
Lee & Sons Strip Mill (British), Oct 24 p 80
Niles Sheet, Modernization*, Aug 15 p 26; Dec 19 p 42
Review of Sheet, Tin and Strip Mills, Oct 3 p 75
Tata Roughing Mill Records, Oct 31 p 40
Thomas & Co., Richard, to Build Strip Mill in Wales, Nov 28 p 54
Youngstown New Continuous Strip, July 11 p 68; Oct 17 p 34-H*

Rolls:
Composite, Review of Typical Designs in Use*, Sept 19 p 28

Roofing:
Usicast, Cast Iron Plate*, Sept 12 p 10

Roots - Connersville Blower Corpn.:
Small Size Meters, Dec 5 p 44

Rotary Electric Steel Co.:
Industrial Propane for Bright Annealing*, July 25 p 30

Roto-Broach:
Bullard, for Internal and External Service*, Oct 17 p 34

Ruckner and Pickering:
Penalty of Unbalanced Wages and Prices, Oct 24 p 57-C

Ruemelin Mfg. Co.:
Air Filter, Bag-Type*, Aug 1 p 34

Ruff and Schwartz:
Graphite Nuclei in Solid and Liquid Iron Solutions, Oct 10 p 39

Russia:
Blast Furnace Developments*, Aug 1 p 12
Trade Agreement with United States, July 18 p 55

Rust Proofing, Sept 28 p 149

Rustless Iron Corpn.:
Rustless Steel Hopper Car*, Sept 26 p 192
Stainless Steel Freight Container*, Oct 24 p 24
To Consolidate with Rustless Iron & Steel Corpn., Dec 12 p 92

Ryan, Frank:
Paint Stripe Guns*, Dec 5 p 43

Ryerson & Son, Inc., Joseph T.:
Merger with Inland Steel Co., Aug 8 p 94; Sept 26 p 150-D

S

S. & W. Construction Co.:
Steel Piling Applications, Oct 24 p 57-C

Safety:
Foreman's Responsibility, Oct 24 p 30
Mesta Machine Co. Receives Trophy*, Aug 8 p 67
Overalls as an Aid to Accident Prevention in Fosdick Plant*, Dec 26 p 46

St. John X-Ray Service, Inc.:
Unit of Brooklyn Technical High School*, Nov 7 p 34

Salem Engineering Co.:
Ingot Heating Furnace*, Nov 21 p 34

Sandslinger:
Beardsley & Piper Swing Type*, Dec 5 p 49

Satinstrip:
Steel Strip in Stripes and Patterns*, Sept 12 p 67

Satterthwait, George:
Executive Secretary, Cold-Finished Steel Bar Institute, Oct 31 p 41

Schatz Mfg. Co.:
Multi-Tool Punch Press*, Oct 17 p 34-E

Schilling and Harwick:
Separation of Hematite by Hysteretic Repulsion, Oct 10 p 39

Schmitter and Day:
Speed Increasing Gears, Oct 24 p 38

Schneible, Claude B.:
Multi-Wash Dust Collector*, Nov 7 p 43

Schneider, A. W.:
Precision Boring, Sept 19 p 36-B

Schwartz and Ruff:
Graphite Nuclei in Solid and Liquid Iron Solutions, Oct 10 p 39

Schwartz, Benjamin:
Problems of Alloy Steel Scrap Use, Nov 21 p 70

Scrap:
Alloy Steel, Problems of Use, Nov 21 p 70
Exports and Principal Buyers, First Half 1934 and 1935*, Sept 5 p 322
Tin Plate, Embargo Bill Fails, Aug 29 p 33

Screw Machines:
Cleveland Automatic Multiple-Spindle Improved*, July 25 p 34
New Britain-Gridley Multiple-Spindle Unit Design*, Aug 1 p 28

Screws:
American, with Phillips Recessed Self-Centering Head*, Nov 7 p 42

Seaman Body Corpn.:
Vocational Rehabilitation, Aug 15 p 44
Security Bill, Aug 15 p 48; Aug 29 p 32

Selenium:
For Free Machining, Sept 12 p 28

Seybolt and Mathewson:
Solubility of Oxygen in Cobalt, Oct 10 p 37

Shallcross Controls, Inc.:
Steam Boiler Combustion Control Device*, Nov 7 p 43

Shapers:
Developments in*, Sept 5 p 181
Fellows Hourglass Gear*, Oct 3 p 32

Shaw-Box Crane & Hoist Co.:
Grip Lifter*, Sept 19 p 36
Hand Trolley Hoists*, Nov 7 p 43
Welded Steel Soaking Pit Trolley*, Sept 19 p 31

Shears:
Helwig Box Strap*, Sept 12 p 34
Niagara Squaring, for 16-Gage Metal*, Dec 5 p 47

Sheet Classifier:
Jones & Laughlin*, Oct 3 p 26

Sheets, Galvanized Iron:
South African Dumping Duty Against British and American, Nov 28 p 49

Sheets, Steel:
Ferro-Therm Insulation*, Oct 24 p 34
Flat Rolling of, Oct 3 p 75
For Construction of Pressed Steel Boats*, Aug 1 p 23

For House Construction*, Aug 1 p 38; Dec 26 p 17-D
Improved Statistics Suggested, July 4 p 60
Prices of Automobiles and, Nov 7 p 33
Sales, Labor's Share Per Dollar, 1923-1934, Dec 19 p 45

Shipbuilding:
World, Aug 15 p 68; Oct 31 p 77

Shire, A. C.:
Potential Market for Steel Frame Houses, Oct 24 p 49

Shorter, A. E.:
Surface Hardening Method*, Aug 8 p 12

Shorterizing:
Method of Surface Hardening*, Aug 8 p 12

Sidney Machine Co.:
Maximiller*, Oct 3 p 34

Siebel, E.:
Wire Deformation During Drawing, Aug 1 p 24

Siemens & Halske Aktiengesellschaft:
Nickel-Copper-Iron Alloy, Oct 24 p 32

Silicosis:
Industrial Health Problem Discussed at Foundrymen's Convention, Aug 29 p 27

Silverbond:
Jessop New Composite Stainless Steel Bar Stock, Aug 29 p 57

Simplification:
Eaves Trough, Conductor Pipe, Conductor Elbows and Fittings, Oct 31 p 86
Forged Hammers, Dec 19 p 42
Open-Web Steel Joists, Oct 31 p 67

Skelp:
Extras, Dec 5 p 80

Skyride Tower:
Felled by Thermit Mixture*, Oct 24 p 36

Sleeves, Cylinder:
Nitricastiron*, Dec 19 p 31

Sloan, Alfred P.:
Address at Congress of American Industry, Dec 12 p 40

Slottman, Dr. G. V.:
Hydrocarbon Fuel Gases for Cutting, Nov 21 p 50

Smith & Serrell:
Laminated Flexpin Couplings*, Nov 21 p 39

Smith and Palmer:
Copper Alloys, Thermal and Electrical Conductivities, Oct 10 p 38

Smith, Brick and Phillips:
Quenching Stresses and Precipitation Reaction in Aluminum - Magnesium Alloys, Oct 10 p 37

Smith Corpn., A. O.:
Oil Cracking Units with Stainless Alloy Lining*, Nov 21 p 32
Production of High-Yield Casing, Aug 1 p 37

Smith, M. L.:
Thermit Mixture Fells Skyride Towers*, Oct 24 p 36

Society of Automotive Engineers:
1936 Convention Announcement, Dec 19 p 68
Nominations for Officers, Oct 3 p 84

Sopromo:
Welding Flame*, Oct 24 p 33

South Africa:
Dumping Duty Against American and British Sheets, Nov 28 p 49

South Bend Lathe Works:
9-In. Lathes*, Nov 28 p 36

Soviet Union:
(See Russia)

Spark Testing*, Sept 26 p 32; Oct 3 p 22

Sparks, Stanley W.:
Steel Shapes Extrusion Process*, July 25 p 18

Special Tool, Die and Machine Shop Institute:
Annual Meeting, Sept 19 p 69

Speed Reducers:
Foote Motorized Worm*, Oct 24 p 40
James, with Top Mounted Motor*, Dec 5 p 47

Speed Selector:
Warner & Swasey Cutting*, Dec 5 p 45

Spinning:
Metal, Injector Sleeve*, Dec 5 p 40

Spray Booths:
Mahon Hydro-Filter for Automobiles*, Oct 31 p 15

Spraying Machine:
DeVilbiss Swinging Arm*, Oct 10 p 88

Springfield Machine Tool Co.:
Geared Head Engine Lathe*, Oct 24 p 43

Spring Steel:
Automobile, Extras Revised, Sept 19 p 73

Spring Tester:
Coates Elasticometer with Pendulum Scale*, July 18 p 45

Spruance, F. P.:
Rust Proofing, Sept 26 p 149

Square D Co.:
Circuit Breaker*, Dec 5 p 48

Stamping and Forming Machines:
Developments in*, Sept 5 p 194

Standard Truck Caster Co.:
Steel Forged Casters*, Aug 15 p 39

Starbright:
For Bright Nickel Plating, Oct 24 p 33

Star Machine & Engineering Co.:
Precision Drill Grinder*, Dec 5 p 48

Stearns, M. H.:
Accident Record of Republic Buffalo Plant, July 11 p 63

Steel:
(Also see Alloy Steel)
Aging of, Oct 10 p 31
Aluminum in Commercial (Campbell Memorial Lecture)*, Oct 10 p 20; Oct 17 p 28
Carbon, Resistance to Shock Loads, Oct 3 p 48
Case Hardened, Soft Spots on*, Dec 12 p 32
Definitions of Cast Iron and, Nov 7 p 25
Etching Reagents, A. S. T. M. Recommendations, July 18 p 24
Fibrous Crystals—Radial Asterism*, Sept 12 p 67
Foreign, Differential for Purchase on PWA Jobs Raised, Nov 21 p 46
Foreign, Full Protection Denied Against Competition on PWA Jobs, Aug 1 p 46
Foreign, Walsh Bill May Prevent Dumping, Aug 1 p 47; Aug 8 p 67
For Houses, Potential Market, Oct 24 p 49
Freight Traffic in, First Half, Dec 12 p 55
Graphite Nuclei in Solid and Liquid Solutions, Oct 10 p 39
Hardening, Shorter Method of Surface*, Aug 8 p 12
High-Tensile, Granite City, Oct 24 p 90
Ingot Production, June, July 11 p 69; July, Aug 8 p 94; August, Sept 12 p 35; September, Oct 10 p 56; October, Nov 14 p 42; November, Dec 12 p 55
Ingots Yield Less Finished Steel than 30 Years Ago, Aug 1 p 36
Lateral, for Strengthening Brick Columns*, Aug 15 p 24
Masterwalls in Republic's New York Office*, Sept 19 p 32
Nickel-Aluminum Magnet, Aug 1 p 25
Nitrided, Hardness Testing of*, Sept 26 p 22
Nitrided Tool*, Sept 26 p 44
Open-Hearth Boils, Sept 26 p 98
Open-Hearth, Non-Metallic Impurities in, Nov 14 p 21
Production in Mahoning and Shenango Valleys, 1934, Aug 15 p 85
Production of Products for Sale in Second Quarter and First Half, Aug 29 p 61; Nov 21 p 51
Spark Testing*, Sept 26 p 32; Oct 3 p 22
Strip, Coated with Copper Lead*, Aug 8 p 25
Strip, in Stripes and Patterns*, Sept 12 p 67
Tann, Impregnable, for Vault Construction, Nov 14 p 76
Tonnage Requirements for 13 Naval Vessels, Aug 8 p 67
Use in Dams, Oct 24 p 50
Used in Making Toys, Dec 19 p 45

Steel Buildings, Inc.:
Organized to Distribute Steelox Prefabricated Buildings*, Nov 14 p 44

Steel Club of Philadelphia:
Officers, Nov 14 p 52

Steel Heating Boiler Institute:
Officers, Sept 26 p 150-D

Steel Industry:
British, Quotations to Automotive Industry, Dec 19 p 82
Company Executives, Majority Worked Up From Ranks, Dec 12 p 55
How Can Growth Be Measured?* Nov 14 p 18
Income from Sales of Products, 1934, July 25 p 50
Stockholders in, Survey of Oct 10 p 98
Survey, Prior to, During and After Code Under Way, July 18 p 53; Aug 15 p 48

Steelox Prefabricated Buildings:
Steel Buildings, Inc., Organized to Distribute*, Nov 14 p 44

Steel Piling:
German Purchase for Triborough Bridge, Nov 14 p 50
New Applications, Oct 24 p 57-C
Reinforcing Trinity Church with, July 4 p 184

Steel Shapes:
Extrusion of*, July 25 p 18

Steel, Stainless:
Allegheny Large Plate, Oct 17 p 48
Allegheny Tubing, Sept 19 p 44
Breakfast Set*, July 25 p 29
Food Cabinet for White House*, Dec 5 p 41
Kirstein Van with Body of*, Nov 7 p 34
RR-11, Hopper Car Made of*, Sept 26 p 192
Silverbond, New Composite Bar Stock, Aug 29 p 57
Tableware Made of, Dec 19 p 58
Tennis Net*, Dec 12 p 31
Used in Making Watches, Dec 12 p 54

Steel, Stainless Clad:
Large Cereal Cooker*, Dec 26 p 22

Steiner, L.:
Viscometer for Testing Fuel Oils*, Oct 24 p 20

Stettinius, Edward R., Jr.:
To Become Chairman Finance Committee of Steel Corporation, Dec 19 p 68; Dec 26 p 34

Stillwell, C. J.:
Machine Tool Exports, Aug 8 p 26
Rebuild Prosperity with Improved Machinery, Sept 5 p 20

Stokerunit Corpn.:
Grinding Machine for Carbide Tool Work, July 4 p 34

Stretcher:
Hospital Industrial*, Dec 5 p 42

Struts:
Airplane, Manufacture in Cleveland Pneumatic Tool Plant*, Dec 12 p 20

Sundblad, Folke W.:
Non-Metallic Impurities in Open-Hearth Steel, Nov 14 p 21

Sundstrand Machine Tool Co.:
Automatic Lathe for Machining Oil Well Drilling Tool Parts*, July 4 p 30

Sunnen Products Co.:
Model L Grinder*, Nov 7 p 42

Superior Steel Products Co.:
Fabricated Composite Blanking Dies*, Dec 12 p 25

Suslov, N. M.:
Blast Furnace Developments in U.S.S.R.*, Aug 1 p 12

Swasey, Ambrose:
Honored at Luncheon on 89th Birthday*, Dec 26 p 60

Sweden:
Trade Agreement with United States, July 11 p 84

Sweetser, Ralph H.:
Merchant Pig Iron, a Quality Product, Nov 28 p 29

Sykes, Van Horn and Tucker:
Molybdenum - Carbon Alloys, Oct 10 p 38

T

Table:
Pratt & Whitney Tilted Rotary for Jig Boring*, Sept 12 p 33

Table Slide:
Grob, for Band Saw Machine, Nov 14 p 36

Tagliabue Mfg. Co., C. J.:
Temperature and Pressure Controller*, Nov 14 p 34

Tanks:
Bulk Fuel Cylindrical for River Barges*, Dec 26 p 14
Welded, for Propane Gas Storage*, Aug 15 p 44

Tann Steel:
British Tank Vault Constructed of, Nov 14 p 76

Tapping and Drilling Machine:
Kingsbury, with Unit Head Construction*, Oct 24 p 42

Tapping Attachments:
Ettco-Emerick*, Oct 24 p 41

Taps:
Landis Extension Link for Collapsible*, Aug 1 p 35

Tariff:
Colombian Import, Oct 17 p 48
Brazil and United States Trade Agreement, Nov 21 p 75; Dec 5 p 67
Reciprocal Trade Agreement With Canada, Nov 21 p

50-B; Nov 28 p 48; Dec 5 p 67
Reciprocal Trade Agreement with Netherlands, Dec 26 p 36
Trade Agreement Between United States and Sweden, July 11 p 84

Tata Iron & Steel Co.:
New Roughing Mill Records, Oct 31 p 40

Taxes:
26 Steel Companies Since 1929, July 18 p 47
Chamber of Commerce of United States to Study Federal, Sept 26 p 152
Corporation Bill Based on Fallacy, Dec 26 p 15
Corporation Bill Condemned, July 4 p 51; July 11 p 62
Industrial, Continental Can Co. Demonstrates Rise in, Dec 19 p 43
Legislation, High Lights of, Aug 29 p 32
Sales, National Industrial Conference Board's Survey of States, July 11 p 71

Taylor-Instrument Companies:
Re-Set Control Device, Aug 15 p 37

Taylor-Winfield Corpn.:
Electric Resistance Heating Machine*, July 4 p 34
Flash Welders for Pontiac Fenders*, July 11 p 18

Temperatures:
Measurements, Oct 10 p 39

Tennessee, Coal, Iron & Railroad Co.:
Sheet-Clad House*, Aug 1 p 38

Tennis Net:
Made of Allegheny Stainless Steel*, Dec 12 p 31

Testing Machines:
Detroit Brinell Hardness*, Oct 17 p 34-F
Magnetic, for Bars and Tubes*, Dec 5 p 41

Thermit:
Fells Skyride Tower*, Oct 24 p 36

Thomas & Co., Ltd., Richard:
Licensed to Use American Continuous Sheet Rolling Patents, Dec 26 p 36
To Build Strip Mill in Wales, Nov 14 p 52; Nov 28 p 54

Thompson, C. S.:
Modernizing Equipment*, Sept 5 p 42

Thompson Products Co.:
Nitricastiron Cylinder Sleeves*, Dec 19 p 31

Thomson-Gibb Electric Welding Co.:
Resistance Welding All-Metal Radio Tubes*, Aug 15 p 35
Resistance Welding Copper-Plated Steel Tubes*, Oct 24 p 35
Seam Welders for Refrigerator Evaporators*, Aug 15 p 37

Threading and Grooving:
On Vertical Boring and Turning Mills*, Dec 26 p 10

Threading Machine:
Acme Bolt*, Oct 10 p 50
Developments* Sept 5 p 135
Landis, for Double-End Work*, Nov 7 p 44
Oster-Williams Bolt*, Oct 3 p 35

Time Controls:
Automatic Repeat, July 18, p 45

Timken Roller Bearing Co.:
Mirror Finish on Bearings*, Oct 17 p 44

Tinned Ware:
Cleaner for, Oct 24 p 33

Tin Plate:
For Beer Containers*, July 4 p 28; July 11 p 90
Improved Statistics Suggested, July 4 p 60
Scrap, Embargo Bill Fails, Aug 29 p 33

Toledo Machine & Tool Co.:
Punch Presses Streamlined and Strengthened*, July 4 p 34
Straight Column Press*, Nov 21 p 38

Toledo Scale Co.:
Weight Control at Remote Point, Dec 12 p 36

Tool Steel:
Nitrided*, Sept 26 p 44

Tools:
Small, Developments in*, Sept 5 p 211

Torch:
Torit Natural Gas*, Nov 7 p 42

Torit Mfg. Co.:
Natural Gas Torch*, Nov 7 p 43

Torrence, George P.:
(Taxes) What Are You Willing to Pay? Oct 17 p 15

Torrington Co.:
Acquires Bantam Ball Bearing Co., Oct 3 p 36

Towers:
Standardized Steel Lookout, Aug 1 p 26

Toys:
Steel Used for Making, Dec 19 p 45

Trade Agreements:
Brazil and United States, Nov 21 p 75; Dec 5 p 67
Canadian Reciprocal with United States, Nov 21 p 50-B; Dec 5 p 67
Columbian-United States Reciprocal Tariff, Oct 7 p 48
United States-Netherlands Reciprocal Tariff, Dec 26 p 36
United States and Russia, July 18 p 55
United States and Sweden, July 11 p 84

Trade Practice:
Pattern for Conferences Suggested, Aug 22 p 41

Trailers:
Arc Welding Frames*, Aug 15 p 29

Transmissions:
General Hydraulic Variable Displacement*, Nov 28 p 39
Link-Belt P.I.V. Variable Speed*, Dec 26 p 17-H

Trimming Machines:
Eisler Combination Welding, Cutting and*, Sept 12 p 34

Trinity Church:
Reinforcing with Sheet Piling, July 4 p 184

Triplex Machine Tool Corpn.:
Swiss Thread Grinding Machine*, July 4 p 33

Trolley:
Shaw-Box Welded Steel Soaking Pit*, Sept 19 p 31

Trostel, Louis J.:
Refractory Processes and Materials*, Nov 21 p 18; Dec 5 p 26

Trucks:
Baker-Raulang Hylift*, Aug 1 p 33
Heil Co. Reduces Body Weight*, Aug 15 p 41
Mercury Non-Tilting Coil Lift Hydraulic*, Dec 5 p 48

Truesdale, Wilcox and Rodda:
Zinc-Rich Portion of Iron-Zinc System, Oct 10 p 37

Truscon Steel Co.:
Merger with Corigan, McKinney Steel Co. and Republic Steel Corpn., Sept 26 p 147; Oct 24 p 79

Tubes:
Allegheny Stainless Steel, Sept 19 p 44
Copper, Manufacture in Wolverine Plant*, Dec 19 p 24
Copper-Plated Steel, Resistance Welding*, Oct 24 p 35
Metal Radio, Brazing in Electric Furnace*, Dec 26 p 17-F
Metal Radio, Resistance Welding*, Aug 15 p 35; Oct 10 p 36
Vertical Hot Annealers*, Nov 21 p 26

Tucker, Sykes and Van Horn:
Molybdenum - Carbon Alloys, Oct 10 p 38

Tuechter, August H.:
President Cincinnati Bickford Tool Co.*, July 11 p 27

Tumbling Machine:
Barber Continuous Operation*, Dec 26 p 17-G

Tunstall Steel, Ltd. (British):
To Erect Plant for Manufacture of Sheets, Forgings and Stampings for Austin Cars, Dec 19 p 46

Turbines:
Allis-Chalmers Shipment for Boulder Dam*, Dec 26 p 17
Hydraulic for Boulder Dam*, Dec 5 p 42

Turning Machines:
Developments, Sept 5 p 135

Turntable:
Mathews Strip Steel, Oct 3 p 31

U

Udylite Co.:
Handiplater*, Aug 15 p 38

Union Special Machine Co.:
Modernizing Equipment*, Sept 5 p 42

United American Bosch Corpn.:
Oil and Grease Forced Feed Lubricators*, Dec 5 p 37

United Automobile Workers' International Union:
Drive to Unionize Automobile Plants, Sept 19 p 36-F

United Engineering & Foundry Co.:
Contract for Carnegie-Illinois Plate Mill, Dec 12 p 81
Order for Armco Hot Mill, Oct 10 p 80
Quarterly Report, Aug 1 p 48
Welding Manipulator*, July 25 p 36

United States Lines:
Contract for New Liner, Dec 19 p 68

United States Pipe & Foundry Co.:
Usicast, Cast Iron Plate Roofing*, Sept 12 p 10

United States Steel Corpn.:
Builds First Navy Vessel, Oct 3 p 64
Consolidates Detroit Sales Activities*, Sept 26 p 143
Employee Representation Vote, July 4 p 98
Filbert, W. J., Retires as Chairman of Finance Committee, Dec 19 p 68; Dec 26 p 34*
Merges Carnegie and Illinois Steel Companies, Sept 26 p 150-B
Proposed Mergers of Subsidiary Companies, Sept 26 p 150-C
Quarterly Report, Aug 1 p 56; Oct 31 p 60
Steel Shipments, June, July 18 p 46; July, Aug 15 p 59; August, Sept 12 p 45; September, Oct 17 p 36; October, Nov 14 p 51; November, Dec 12 p 56
Stettinius, Edward R., Jr., to Become Chairman of Finance Committee, Dec 19 p 68; Dec 26 p 34

Universal Atlas Cement Co.:
Safety Record, July 11 p 70

University of Wisconsin:
Test of Reinforced Brick Column*, Aug 15 p 24

Usicast:
Cast Iron Plate Roofing*, Sept 12 p 10

Utley, S. Wells:
Industrialist and Politics, Dec 12 p 42
Whip of Political Dominion, Dec 12 p 19

V

Vacuum Cleaners:
Finishing Parts in Geier Plant*, Nov 28 p 34

Valves:
Consolidated Flocontrol*, Aug 15 p 39
Fairbanks Plug-Type*, July 25 p 37; Aug 15 p 38
Jenkins Color for Indicating Service*, Aug 15 p 39

Van Deventer, John H.:
Barber Goes the New Deal One Better, Nov 28 p 13
Be Case-Hardened but Not Complacent, Aug 22 p 15; Sept 5 p 277
Believe It or Not (Wealth Sharing), Nov 14 p 17
Breathing Spells, Sept 19 p 17
Bulls in China Shops, Nov 7 p 19
Fifteen Thousand Million Dollars, Nov 21 p 17
Hot Weather Briefs, Aug 1 p 11
In Buying Security, Who Pays for What? Oct 24 p 49
Isn't It Silly? (Townsend Plan), Dec 26 p 9
Lamps, New, for Old, Oct 10 p 13
Mechanization in Industry, Nov 28 p 43
New Deal—Perhaps We Are Old Fashioned, July 25 p 17
Potatoes, Are You Interested in? Aug 29 p 9; Sept 12 p 9
Security, a Search for, Oct 31 p 11
Soak the Rich and Smash the Big, July 4 p 11
To the Collectors of Little Hoards, Dec 5 p 19
To the Keepers of the Pocketbooks, Oct 3 p 13
Where Angels Fear to Tread, Aug 15 p 15
Whose Overcoat Are You Paying for? Dec 19 p 17
Youth Will Be Served, Sept 5 p 80

Van Horn, Sykes and Tucker:
Molybdenum - Carbon Alloys, Oct 10 p 38

Van, Moving:
Body of Stainless Steel*, Nov 7 p 34

Verity, George M.:
Must Charity Begin—and End—at Home? Aug 1 p 49
Vice-President, American Iron and Steel Institute*, Oct 24 p 57

Viscometer:
Steiner, for Testing Fuel Oils*, Oct 24 p 20

Vise:
Gier Machine*, Oct 17 p 34-G

Volz, Carl W.:
Iron and Steel Metallurgy in Norway, Oct 10 p 38

W

Wages:
(See Labor)

Wagner-Connery Bill:
Held Unconstitutional by Committee of Lawyers, Sept 26 p 153
High Lights of Legislation, Aug 29 p 31
Limitations, Difficulties of Defining, Sept 5 p 276
National Labor Policy and, July 4 p 61

Regional Boards for Regulation of, Sept 19 p 50
Scope of Limited by Constitution, July 11 p 60

Waite, L. M.:
Die Castings, Automotive*, Nov 7 p 31
Extrusion of Steel Shapes*, July 25 p 18
Machine Tool Trends, July 4 p 180; July 11 p 98; July 18 p 88; Aug 1 p 90; Aug 15 p 82; Aug 22 p 66; Oct 24 p 57-D; Nov 21 p 76; Dec 19 p 70
Manufacture of Beer Cans*, Nov 28 p 22
Monarch Engine Lathe Development*, Aug 29 p 15
Multiple-Spindle Screw Machine Unit Design*, Aug 1 p 28

Wallingford Steel Co.:
Ludlum Steel Co. Has Option to Acquire, Sept 5 p 268

Walsh Bill, Aug 1 p 47; Aug 8 p 67; Aug 15 p 47; Aug 22 p 42; Aug 29 p 33

Waltz and Motok:
Determination of Aluminum and Alumina in Steels, Dec 26 p 23

Warner & Swasey Co.:
Improved No. 4 Turret Lathe*, Nov 7 p 40
Speed Selector*, Dec 5 p 45

Warrick and McCollam:
Pickle Pitting, Oct 10 p 34

Washers and Disks:
Determining Weights of*, Aug 1 p 18

Watches:
Stainless Steel Used in Making, Dec 12 p 54

Waterbury Farrel Foundry & Machine Co.:
Bench Power Press*, Sept 19 p 36
Continuous Automatic Transfer Press*, Nov 21 p 39

Waters-Genter Division McGraw Electric Co.:
Stainless Steel Food Cabinet for White House*, Dec 5 p 41

Wattrous, Ltd.:
Stainless Clad Steel Cereal Cooker*, Dec 26 p 22

Wean Engineering Co.:
Refinement of Wilson Covers, Aug 8 p 54

Weiger, J. A.:
Resistance Welding in Automotive Industry*, Nov 7 p 20

Weight Control:
Toledo, at Remote Point, Dec 12 p 36

Weir, E. T.:
Condemns Corporation Tax Bill, July 11 p 62; Dec 26 p 15
Government Invasion of Economic Sphere, Sept 19 p 26-G

Weirton Steel Co.:
Employee Representation Vote, Dec 19 p 73

Welding:
All-Metal Radio Tubes*, Aug 15 p 35; Oct 10 p 36
And Cutting High Chromium Steel, Nov 21 p 48
Arc, Residual Stress Effects in Tension Specimens*, Sept 26 p 78
Arc, Trailer Frames*, Aug 15 p 29
Copper Alloys, Resistance, Oct 10 p 36
Diesel Engine, Continental Light-Weight 10-Cylinder
Distortion, Symposium, Oct 10 p 35
Electric, 89-Mile Pipe Line*, Sept 12 p 24
Electric Arc, Bronze Overlays on Steel*, July 4 p 22
Flash, Pontiac Fenders*, July 11 p 18
Gas, Aluminum and Its Alloys, Nov 21 p 50
Gas, Pressure Vessels, Nov 21 p 50-A
Growth in Welded Structures, Oct 24 p 80
Low Alloy Steels, Oct 10 p 34
Mechanical Zig-Zag*, Sept 12 p 29
Operations on Ford Cars, Oct 10 p 47
Pipe, Throughout Dust Storms*, July 4 p 21
Pressure Vessels, Distortion of Seams in, Oct 10 p 35
Qualifying Operators, Dec 26 p 29
Resistance, Copper Plated Steel Tubes*, Oct 24 p 35
Resistance, in Automotive Industry*, Nov 7 p 20
Soaking Pit Trolley, Shaw-Box*, Sept 19 p 31
Steel Gear Blanks*, Nov 14 p 23
Tank for Propane Gas Storage*, Aug 15 p 44

Welding Flame:
Sopromo*, Oct 24 p 33

Welding Generator:
Westinghouse Cross Field*, Dec 5 p 38

Welding Machines:
Adams Portable Arc*, Sept 12 p 34
Eisler Combination Cutting, Trimming and*, Sept 12 p 34
Federal Percussion*, Sept 12 p 27
Federal Spot, for Aluminum Alloy Airplane Parts*, Nov 14 p 33
Flash for Pontiac Fenders*, July 11 p 18
Lincoln Special Engine Driven*, Nov 28 p 38
Thomson-Gibb Seam for Refrigerator Evaporators*, Aug 15 p 37
Westinghouse Transformer Type*, Oct 3 p 34

Welding Manipulator:
United Engineering & Foundry*, July 25 p 36

Welding Rod:
Linde, for Stainless Steel, Oct 3 p 48

Welin, Carl:
Lightning Did Strike This Plant* (Modernization Contest), Nov 28 p 14

Wellman Engineering Co.:
Arc Welded Salt Evaporator*, Nov 21 p 88

Wesson Co.:
Cemented-Carbide Tool Grinder with Reversible Motor Drive*, Sept 12 p 33

Westinghouse Electric & Mfg. Co.:
Blister-Proof Micarta, Nov 7 p 98
Cross Field Welding Generator*, Dec 5 p 38
Electric Arc Welding Bronze Overlays on Steel*, July 4 p 22
Quarterly Report, Aug 1 p 48; Oct 24 p 54
Transfers Air Conditioning Department to Mansfield, Aug 1 p 82
Welding Machine, Transformer Type*, Oct 3 p 34

West Leechburg Steel Co.:
To Install Cold Strip Mill, Aug 15 p 47

Wheel Dresser:
Carboloy, Diamond Impregnated*, Dec 26 p 17-G

Wheeling Steel Corpn.:
Installs Chapman Floating Agitators*, Dec 5 p 36
Quarterly Report, Aug 15 p 92

Wheels:
Polishing, Carborundum Fiber, Nov 21 p 36

White and Hedgeland:
Gear Finishing, Sept 26 p 149

White Motor Co.:
Piston Manufacture*, Aug 22 p 22

Whiting Co., George:
Bending and Corrugating Machines*, Aug 1 p 34

Whiting Corpn.:
Ball Bearing Ladle*, Nov 28 p 39
Crane with Auxiliary Hoist*, Dec 5 p 46

Whitney Metal Tool Co.:
Small Welded Punch Press*, Sept 12 p 34

Wibel, A. M.:
Appraising Machine Tool Replacement Possibilities*, Sept 5 p 26

Wickwire Spencer Steel Co.:
To Be Reorganized, Nov 28 p 66

Wilcox and Fuller:
Aging of Zinc Alloy Die Castings, Oct 10 p 38

Wilcox, Truesdale and Rodda:
Zinc-Rich Portion of Iron-Zinc System, Oct 10 p 37

Wiley, Brent:
Managing Director Association of Iron and Steel Electrical Engineers, Dec 27 p 37

Wille and Mohr:
Hot Blast Stoves, Analysis of Design and Construction*, July 4 p 12

Wilson Engineering Co., Lee:
Refinement of Wilson Covers, Aug 8 p 54

Wilson, Lee:
Vertical Hot Tube Annealers*, Nov 21 p 26

Wire:
Steel, Manufacture and Influence of Grain Size*, Oct 10 p 14; Oct 17 p 23

Wire Association:
Convention Program, Aug 1 p 17

Wire Drawing:
Deformation During, Aug 1 p 24

Wire Products:
Revised Method of Quoting, Aug 22 p 42-C

Wire Rope:
Macwhyte Exhibit of Manufacture*, Nov 14 p 32

Wittek Mfg. Co.:
Coil Reel with Automatic Arm Control*, Dec 5 p 49

Woisin, Dr. H. E.:
Vibrating-Push Conveyor for Hot Materials, Aug 29 p 19

Wolff, Henry W.:
Takes Exception to Editorial, Aug 15 p 42

Wolverine Tube Co.:
Manufacture of Copper Tubing*, Dec 19 p 24

Wood Co., R. D.:
HydroLectric Press*, Nov 14 p 35; Dec 26 p 17-H

Wrought Washer Mfg. Co.:
Determining Weights of Washers and Disks*, Aug 1 p 18

X

X-Rays:
St. John X-Ray Service Unit in Brooklyn Technical High School*, Nov 7 p 34

Y

Yale & Towne Mfg. Co.:
Pull-Lift Device*, July 25 p 36

Young, Arthur H.:
Industrial Relations, Oct 3 p 39

Youngstown District Industrial Marketers:
Organized, Oct 3 p 36

Youngstown Sheet & Tube Co.:
Continuous Strip Rolling Mill, July 11 p 68; Oct 17 p 34-H*
Ingot Heating Furnace*, Nov 21 p 34
Quarterly Report, Oct 31 p 42
Vacations with Pay, July 4 p 63

Z

Zaiser and Dreher:
Bronze as a Forming and Drawing Die Material*, July 25 p 22

Zam:
New Plating Anode, July 11 p 110

Zerbee & Co., L. J.:
Steel Garden Chair*, Oct 3 p 25

Ziebarth, C. A.:
Finishing Motion Picture Cameras and Projectors*, Aug 15 p 16

Zimmerman, J. H.:
Oxy-Acetylene Cutting of Steel Plate, Nov 21 p 50

Zinc Ammonium Chloride:
In Modern Galvanizing*, July 18 p 18

Zinc Electroplating:
Vs. Cadmium Plating for Corrosion Resistance, Nov 21 p 36

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